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MOTORSHIP

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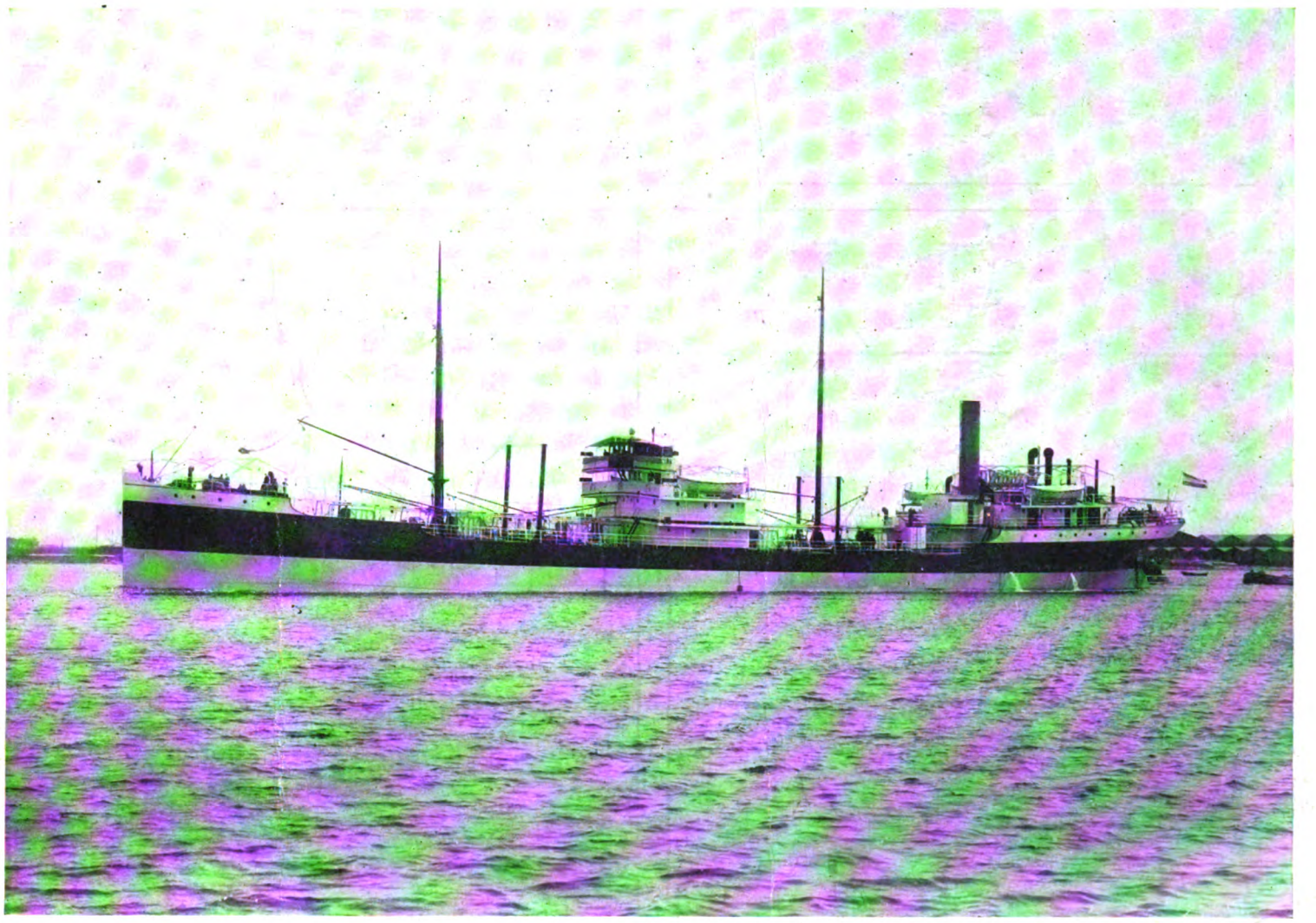
In the Interests of Commercial Motor Vessels

Vol. 2 AUGUST, 1917 No. 8

SEATTLE NEW YORK



MOTORSHIP "SELENE," OWNED BY ANGLO-SAXON PETROLEUM CO.

Sister Ship to the "Ares," "Artemis," and "Hermes"

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Vol. 2 SEATTLE, U. S. A., AUGUST, 1917. No. 8

Motorships and Their Operation

Series I.

The M. A. "City of Portland" and the M. A. "S. I. Allard"

[*So many false and unfounded reports and exaggerated rumors are afloat regarding the running and operation of motorships, that we have decided to combat this malicious influence by regularly publishing a series of articles on the operation of existing motorships, paying particular attention to domestic-owned vessels, and thus enable shipowners to ascertain for themselves as to how much credence can be placed in these base stories. We shall give the facts exactly as placed before us by the owners of the individual ships concerned, and even vessels that may have proved unsuccessful—for we will not deny that a few have been failures—will be dealt with; but in such cases we believe that we shall be able to produce sufficient evidence to demonstrate that the principle of the internal-combustion-oil-engine is not the responsible factor of non-success. We appeal to all motorship owners to co-operate with, and to assist us, in this campaign, which will be to the ultimate benefit of the entire motorshipping industry. The first of this series deals with the two McCormick ships, namely the "CITY OF PORTLAND" and the "ALLARD," while the second article will deal with the M. S. "BRAMEL POINT," owned by the Vacuum Oil Company.—The Editor.*]

A SHIPOWNING friend of ours several times has been on the point of ordering a full-powered Diesel-driven ship and motor-driven wooden auxiliaries; but each time has been deterred by the advice of steam shipowning friends or professional consultants, who have drawn his attention to the reported failures of various motorships. When a man has real money at stake he naturally does not wish to invest in a doubtful proposition and when told (by men who should know the truth) that motorships are very risky investments it is not hard to see why our friend still remains steadfast to steam. Many are the similar cases that almost daily come before our notice. In the foregoing instance our friend was informed from several sources that the "City of Portland" was a distinct failure, and that she was laid up two months in Australia undergoing repairs. One of his informants was an official of one of the great ship registeries. The following account of the voyages of this ship will enable our readers to judge for themselves whether this vessel is a success or a failure. Seeing that in five months she logged 22,000 nautical miles almost entirely under power without sail, the result is better than many full-powered steamers can show.

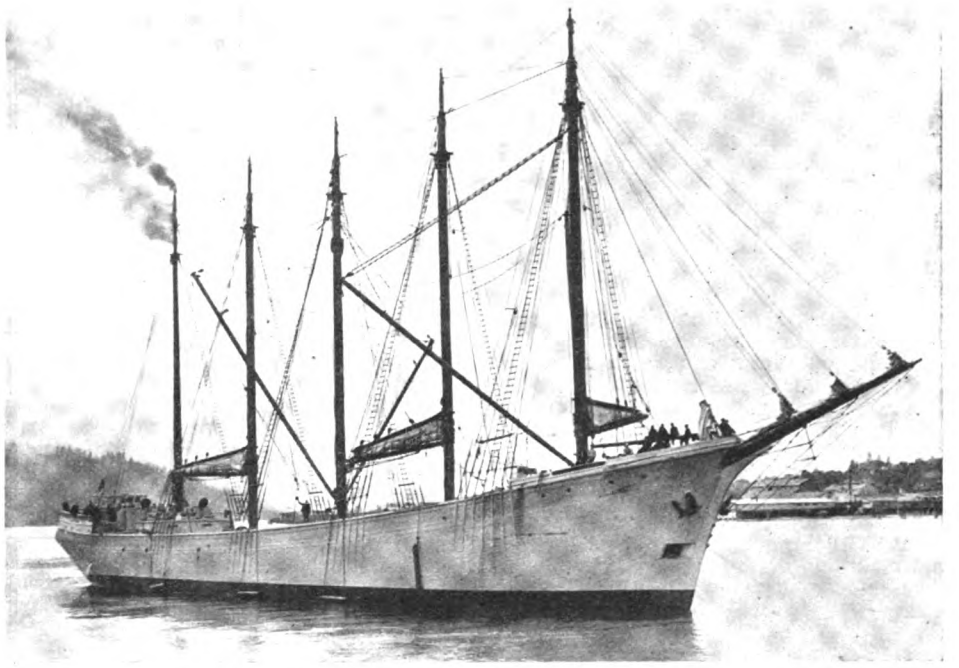
The following is taken from a report supplied by Chas. R. McCormick & Co., of San Francisco, to whose courtesy we are greatly indebted. We had the privilege of personally inspecting the engineer's log, so can verify its accuracy. Incidentally we may mention that this old established concern are owners of seven steamers as well as three motorships. First of all we will give a few statements made by Mr. W. R. Hewitt, their marine superintendent and consulting engineer, who is responsible for the operation of all their fleet.

(1) After the long and successful voyage of the "City of Portland" the reliability of internal-combustion-engines hardly need be questioned.

(2) The M. S. "Allard" ran from Astoria to Honolulu (2,100 miles) in 13½ days without a complaint of any kind whatever from her engine equipment.

(3) The "City of Portland" ran from San Francisco to Honolulu (2,100 miles) in 13 days.

(4) The amount of overhauling and repairs after a round voyage San Francisco-Australia-San Francisco was insignificant.



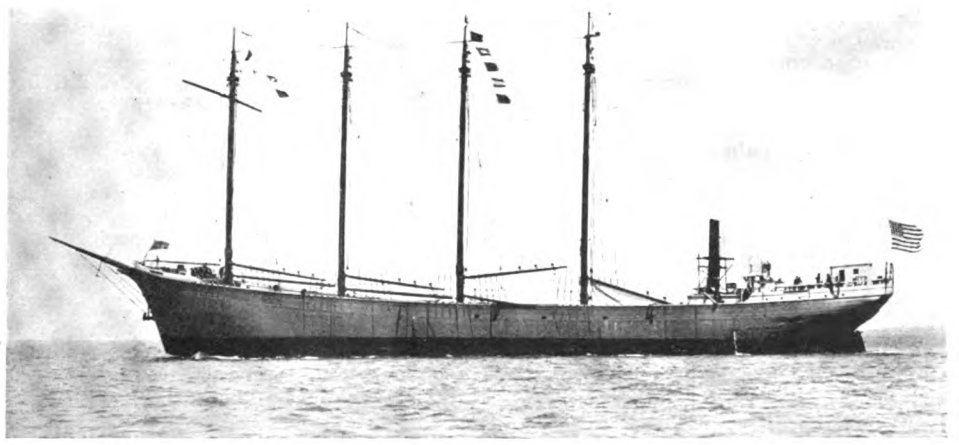
MOTOR AUXILIARY SCHOONER "CITY OF PORTLAND"

(5) This type of vessel is bound to become a permanent type in the tonnage of the world.

(6) Our belief is that wooden hulls if oil-motor-driven will operate at a profit in competition with steel coal-burners in any port of the world.

(7) It is very likely that wooden hulls of large tonnage will be built and equipped with the true Diesel engine in the near future.

(8) We are justified in continuing to build this type of boat.



MOTOR AUXILIARY SCHOONER "S. I. ALLARD"

(9) The "City of Portland" was in charge of engineers who never had previous experience in operating motors.

(10) Our future vessels will have two 500 h. p. motors, the two 320 h. p. motors not being sufficient power, as we run the motors at all times regardless of wind and sail, making the canvas auxiliary to the power.

It is with very considerable pleasure that we record the honest opinion of an experienced American steamship and motorship operator and owner, and trust that other shipowners in the United States will take his words to heart and pay little attention to stories of mishaps to motorships unless supported by facts. Even then dig deeply into the history of the ship and machinery and ascertain the real causes; for, as Mr. R. W. Crowly, the Diesel expert, says, "prejudices have been created in the United States against the marine Diesel-type engine primarily by failures of certain engines made in this country and abroad; **but also by the lack of discussion of these failures.** If reason clearly be shown for the failures of certain designs of any special class of machinery, then it is possible to gain appreciation for the success of other designs of that same class of machinery, whereas if the failures are allowed to remain undisturbed recollections in the minds of engineers and shipowners, then one must expect that the whole class of machinery will be branded as unfit."

On the trial trip of the "City of Portland," say Messrs. McCormick, she was operated under pow-

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er alone without cargo, and with a displacement of 1,800 tons she developed an average speed of 9.25 miles per hour in the Columbia River. The vessel was then loaded with 2,800,000 feet of fir timber, giving her a mean draft of 22 ft. 4 ins. on a displacement of 5,100 tons, with a free board of 18 ins. [In other words the actual weight of the cargo without counting fuel, etc., was 3,300 tons. —Ed.]. All the manoeuvering necessary in the Columbia River and passing out over the Columbia River bar was made under her own power, and at no time did she require the outside assistance of any tug boat.

On the trip down the Coast to the light-ship off San Francisco the "City of Portland" went off shore 100 miles in order to take advantage of prevailing wind. She made this run of approximately 650 miles in 62 hours, the wind at no time being over 25 miles per hour. From San Francisco to Honolulu she took but 13 days, covering a distance of 2,100 miles, during which time light and variable winds prevailed.

From Honolulu to Port Pirie, Australia, which is approximately 5,000 miles, she took 36 days; but during the entire trip her sails were of little or no available use. (In this connection Motorship would remind readers that the 'City of Portland' is an auxiliary and not a full-powered motor-vessel, so that the average speed of 5¾ knots maintained for 36 days and nights is really very good, and in view of the fact that the sails were of no use during the trip it can be imagined how long she would have taken had she no auxiliary motor-power installed).

When she arrived at Port Pirie she was immediately ready to discharge her cargo; but owing to the war regulations then in force she was unable to secure a berth. However, after considerable delay her captain was able to get the cargo discharged, and then proceeded for Newcastle, arriving there in 7 days. Seeing that this is a distance of approximately 1,700 miles, the average of a little over 10 knots is exceptionally good.

Unfortunately at Newcastle a coal strike was encountered, consequently the "City of Portland" was delayed there for 60 days at anchor awaiting a cargo of coal for Honolulu. During this time the vessel's bottom became very foul with barnacles, yet notwithstanding this condition she made a very practical return voyage from Newcastle to Honolulu, and from Honolulu to the Columbia River, Cal. When she was drydocked the barnacles were found to be about one inch thick on the bottom, and on these being scraped off no signs of worms could be seen. Furthermore the keel was as straight as the day she was launched, with no signs of hogging, and generally speaking the vessel was as tight as a bottle.

"Here again it is necessary for Motorship to put in a few words. The voyage back from Australia took rather a long time, and considerable reports were current in the shipping world that this was due to bad operation of the engines, and we will use Messrs. McCormick's words to prove that these rumors were entirely false and without foundation."

Considerable difficulty was met with in obtaining fuel-oil in Australia due to the owners of the ship neglecting to arrange beforehand a sufficient supply, consequently the captain thought it advisable to put in at Papeete while on the run from Sydney to Honolulu, thus he went some 3,000 miles off his course, and then doubled back in order to obtain fuel at Papeete.

The best fuel that he could obtain there was fuel oil of about 16 deg. Baume, which oil altogether is too heavy for satisfactory sea-going operation of surface-ignition type oil-engines; but nevertheless the engineer used this oil and proceeded on the voyage. (Here again Motorship will put in a few words to draw attention to the fact that the engines in the 'City of Portland' are not true Diesel-type engines; but are of the class commonly and erroneously known as semi-Diesel, which, of course, would not burn such heavy oil as the true Diesel). It also may be pointed out that this ship originally was designed to make the run from San Francisco to New York City via the Panama Canal; but owing to Canal trouble and the tempting charters available, she was placed on the Australian run, thus the difficulty in obtaining fuel.

Messrs. McCormick state that the amount of overhauling and repairs at the end of this long-run voyage was insignificant, particularly when they consider that the machinery was in charge of engineers who previously had had no experience in operating motors, consequently they consider it to be a very practical performance as to the reliability of this type of motor, and had this vessel been operating coastwise they would have had the opportunity of making necessary adjustments in the engine-room within comparatively short periods of time due, of course, to the shortness of the voyage. Then there could have been no comments whatever on her performance under power.

The policy of Messrs. McCormick is to operate the engines at all times, regardless of the conditions of the weather, and the strength of the winds, so that the sail is auxiliary to the power, and not the power auxiliary to the sail. They frankly admit that in view of this they made a mistake in only installing the total of 640 b. h. p., whereas at least 1,000 b. h. p. should be fitted.

At the time these engines were purchased they were the largest units then on the market of that particular make. Since then they understand that 500 b. h. p. units are being made, and when they build another vessel of its size they will install two units of 500 b. h. p. each, which they state will be along the lines of development towards the full-powered boat, which this type of vessel must eventually become. Furthermore, this type of vessel is bound to become a permanent type in the tonnage of the world.

That the internal-combustion engine, when properly installed and with sufficient fuel tankage, will permit the wooden hull to operate at a profit in competition with steel coal-burners in any port of the world is their firm belief. They look for a rapid development of this type of engine within the near future and it is very likely that wooden hulls of large tonnage will be built and equipped with the true Diesel engine in the near future, which will eliminate some objectionable features that the hot-bulb engines now have today.

The actual operating time of the "City of Portland" on this voyage was 5 months, during which time she covered some 22,000 miles, and these engines made practically a continuous voyage without shop repairs, and so McCormick Co. consider that they are justified in continuing to build this type of vessel, making such improvements as will naturally develop in the course of operation.

Regarding their' second ship, the "Allard,' which is a duplicate of the "City of Portland," but launched some months later, not so many operation details are available; but on the run from Astoria, Oregon, direct to Honolulu, a distance of 2,100 miles, not a single complaint of any kind whatever was made from her engine equipment, yet she covered the distance in 13½ days. At the time of Messrs. McCormick's writing (June 6) she is 14 days out to Sydney, Australia, and they looked forward to an early arrival after a creditable run. During the run from Astoria to Honolulu she was loaded with 2,000,000 feet of lumber and she encountered none but light airs, so her sails were of little or no use except on the last day's run, when she ran into the Northwest trade winds, which increased her speed from 7½ knots to 9½ knots. The trial trips at Astoria were exceptionally satisfactory, and she averaged 9.6 miles per hour over the measured mile.

The only difference between the "Allard" and the "City of Portland" is that they have discarded the fifth mast and installed a funnel instead of running the exhaust gases out of the fifth mast, which was of steel. This was done on the advice of the captain, who claims that with her motors operating at all times he has not found it necessary to use the jigger sail, so that the fifth mast really would only be of some advantage in the case of a total breakdown; but, as her owners put it, after the long and successful voyage of the "City of Portland," the reliability of internal-combustion engines hardly needs be questioned.

Before concluding we will give a few details of the "City of Portland," and the same practically apply to the "Allard," and to the "City of St. Helens," now completing.

She is 278 ft. o. a., 48 ft. beam and 19 ft. 6 in. depth of hold, with 'tween deck beams and a fore- and aft, or longitudinal steel truss, set in between the under side of the main deck beams and the top of the keelsons, and extending the full length of the vessel. She is five-masted, baldheaded, schooner-rigged, and is equipped with two 320 b. h. p. Bolinder surface-ignition oil engines, located in the stern of the vessel. Her oil tank capacity is 1,700 bbls., fresh water tankage 10,000 gallons, and is equipped with steam, fire, sanitary, and bilge pumps and a complete pumping system for the fuel oil.

For handling cargo she is equipped with four 8x8 vertical steam winches of the Pacific type and an 8x8 steam anchor windlass and one 5x7 steam capstan, all of which are operated by a dry back horizontal donkey-boiler in the engine-room 66 inches in diameter, carrying 130 lbs of steam. For operating at sea, all pumps, winches, windlass and capstan are operated with compressed air at 150 lbs.. pressure so that steam is never carried on the donkey-boiler at sea. This air is taken off the compressors of the main engines and no difficulty whatever has been experienced in obtaining sufficient supply of air at the required pressure at any time.

She has two generators of 5 and 7½ K. W. capacity and an electric steering-gear of the Hewitt type. Her average consumption of fuel-oil, known as the Standard Oil Co.'s Calol of 24 deg. Baume gravity, is 24 bbls. of oil per 24 hours, when developing 640 b. h. p. at 220 r. p. m. This vessel on her trial trip (light) operated under power alone, and having a displacement of 1,800 tons, in the Columbia River developed an average of 9.25 miles per hour.

SCHOONERS FOR KELP WORK.

The American Products company, engaged in the kelp reduction industry in southern California, has purchased the schooners Mayflower and Albion, formerly owned by the Sparks' estate and for many years operated between San Francisco and northern California ports in the lumber trade. The boats will be equipped with auxiliary power and sent to the southern kelp beds. The Mayflower is 80 feet long, 26 feet wide, and of 86 tons net, and was built in 1888. The Albion, 75 tons net, was built in 1886 and is 80 by 27 feet.

MOTORSHIP BUILDING IN GREAT BRITAIN.

According to the June Shipbuilder (England) the Burmeister & Wain Oil Engine Co. of Glasgow, Scotland, are building twelve marine Diesel engines of 3,200 i. h. p. each for eight twin-screw ships now building at shipyards associated with the Lord Pirrie interests. Some are vessels of nearly 14,000 tons d. w. c. These must be the motor vessels building for the Elder Dempster, the Leyland, and the Glen Lines. The Shipbuilder also states that when freer publicity is once more given it will be found that Swan, Hunter & Wigham Richardson, Ltd., have made considerable headway in their marine Neptune-Diesel engine department during the last three years, and that they are in the position to compete favorably with any makers of internal-combustion-engines for ocean-going cargo-ships in Great Britain or any other country. The Neptune-Diesel engine was described in Motorship for June; but at that time we did not mention that Swan, Hunter & Wigham Richardson are now engaged in building Diesel engines for submarines.

NEW BRITISH REGULATION GOVERNING SAILING SHIPS.

The Department of State is informed by the consul general at London of the following Admiralty Order:

"As from 10th of July, 1917, every sailing vessel which exceeds 400 tons gross register or which carries cargo exceeding £4,000 in value shall, when approaching or leaving any port of the United Kingdom or when proceeding coastwise along the coasts of the United Kingdom, be towed within such limits as may be directed by any naval officer who is authorized by Admiralty to give orders to British ships, and every such vessel shall pay for such towage in accordance with scale of fees which has been approved by Admiralty. This regulation shall not apply to vessel not being British vessel where non-compliance with regulation takes place on high seas outside the territorial waters adjacent to United Kingdom."

As this rule does not apply to motor-driven auxiliaries, owners of sailing ships had best install motor power.

THE HAMBURG-AMERICA LINE AND MOTORSHIPS.

We recently announced that the Hamburg-America Line and the A. E. G. had combined in establishing a large Diesel motorshipbuilding yard near Hamburg. The reason of this is clear, when we give the Hamburg-America Line's own comparisons of Diesel motorships and steamers which they owned before the war.

Working Expenses per Ton and 1,000 Miles.

Sister steamship	1.32c	100 percent.
Two-stroke-cycle motorship...	1.2c	91 percent.
Four-stroke-cycle motorship..	0.986c	75 percent.

This shows a saving of 25 percent. for the four-stroke-cycle motor over the steamship and 16 percent. over the two-stroke-cycle motorship. These figures hold only up to the beginning of the war, as the ships are now laid up.

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Notes on the Design of Marine Diesel Engines

By THOS. ORCHARD LISLE, A. M. I., Mar. E.

MANY believe that marine Diesel engines must be constructed with extraordinary care—as in a watch factory. It is the writer's opinion, however, that what is needed is just good, sound steam marine-engineering practice, combined with a thorough knowledge of the special materials, particular methods of casting, the operation and requirements of the Diesel design, and knowledge of sea-going conditions in the engine-room, these being obtained only by dint of experiments and actual experience, or by purchasing the knowledge of others who already have paid in experience to learn. One European firm has proceeded from the first on the theory that the marine Diesel that could not be repaired in any part of the world where steam engines could be repaired was of no use in a ship. Moreover, this firm neither grinds nor laps the cylinders of its engines.

The extraordinary variation in the design of the various marine Diesel engines on the market reveals the fact that features in some motors are absolutely opposed to those of other motors, which shows that there still are some builders who are not possessed of the proper necessary qualifications, however sincere they may be in their efforts and beliefs, and while a certain class of engine may show up well when installed in one type of vessel, it will not stand up when driving another class of ship. For instance, a good yacht's engine is not suitable for a freighter. Features of design that have been abandoned as impractical by some builders after thorough sea-going tests under everyday working conditions, afterwards have been adopted in ignorance by newcomers into the marine field, who have been unable, or are too obstinate, to avail themselves of the educational, but bitter, experiences of others older in the game, who paid heavily to learn the road to success.

Few designers seem to take into proper consideration a very simple reason for cracks resulting when the design is not absolutely correct, and that what may do excellently with a small diameter of cylinder utterly fails when the diameter is increased. Here is the simple reason referred to.

As the cylinder diameter increases, the wall surface increases rapidly, the cylinder walls are made thicker, also the jacket water is farther and farther away from the heat center. Yet the jacket water cannot be made cooler to counteract this effect. These factors are not so quickly applicable to a four-stroke-cycle engine, because of only half the combustion strokes, incidentally greatly reducing the average temperature; but even with this type having cylinders over 16 in. bore it is usually very necessary to water-cool the pistons. With two-cycle engines any cylinders over 15 in. bore should be water-cooled. Oil cooling of pistons should be avoided like poison at all times, no matter how tempting its use may be to the designer. While the flow of oil is constant it is serviceable; but let the flow of oil be interfered with for a few minutes, the piston practically is converted into a highly explosive bomb, the drain of oil remaining in the piston being converted into a vapor, and the hot piston that results from the stopping of the cooling element will do the rest.

Even with really excellent designs, produced by experienced Diesel engineers, troubles or weaknesses—some minor—some more serious—have resulted. In some instances this has been due to carelessness, indifference, or inexperience of the operators; but these troubles have mostly been such that they were overcome without interfering with the regular working schedule of the ship, and without employing outside assistance. Most troubles, however, have been caused generally through faulty design and lack of sea-going experience, and not through faulty principle.

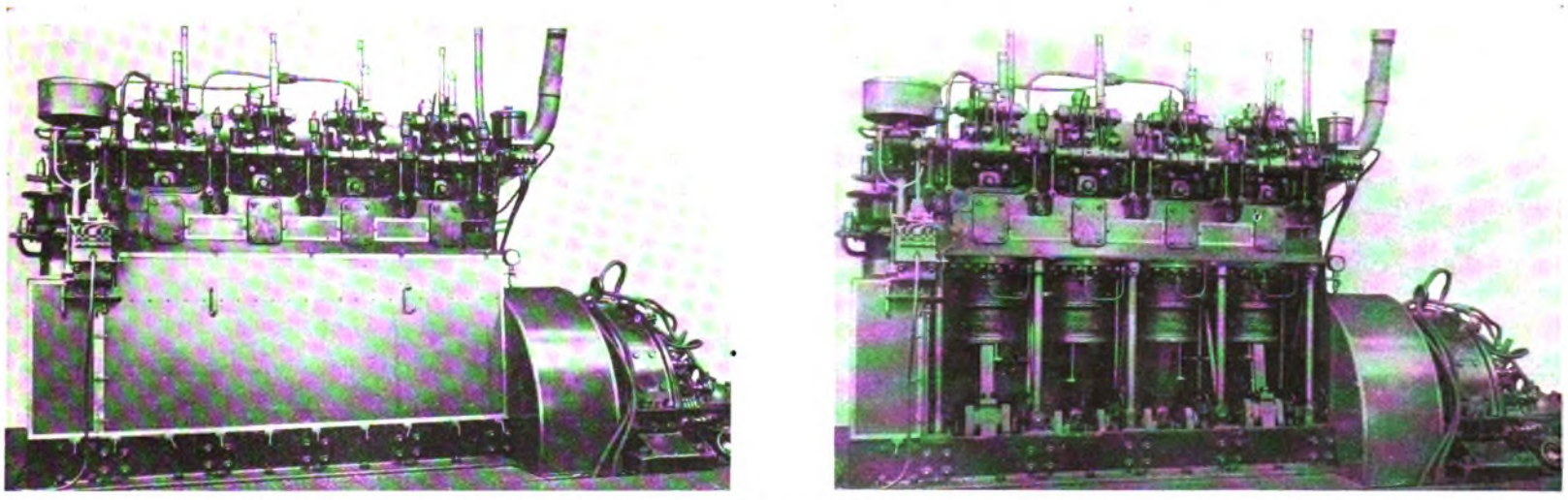
Some designers have placed too much importance in the two-cycle type of Diesel engine simply because higher power can be obtained from the same cylinder dimensions; but, in most existing two-cycle-engined ships the average weight actually has been greater than with four-stroke-cycle engines, while the overall size has not been materially less. Hence the extra cylinder power does not seem important at the present stage, reliability being far more essential.

One reason for main-bearing and big-end bearing troubles with two-stroke-cycle engines is the constant pressure to which they are subjected, tending to make lubrication difficult and unsatisfactory. On the down-stroke is exerted the combustion pressure directly on to the bearings, and on the upstroke the pressure against the cylinders air-compression increases to about 450 lbs. per sq. in., and rises as combustion occurs. This also is borne by the lower halves of the bearings. As this occurs every revolution, the lower halves of the bearings never get any relief and there is one continuous grind, leaving the journals dry to the touch despite flooding with oil. Increasing the bearing surfaces does not seem to meet the need unless they are made all out of proportion to the engine, and the solution of the problem perhaps lies in the double-acting two-stroke-cycle engine. However, other serious problems confront the designer of the double-acting engine.

With the four-stroke-cycle engine, the wear is by no means small, but there are a total of two reliefs on the lower halves of the bearings every two revolutions. On the exhaust-stroke in particular the upward inertia of the heavy pistons tend to lift the crankshaft from its bearings and so allow the lubricating-oil to get over the under halves of the bearings, the pressure then being absorbed by the upper half. For instance, with some large four-stroke-cycle marine Diesels the mean pressure on the main bearings has been well under 650 lbs. per sq. inch, while in two-stroke-cycle marine Diesels of the same power (about 1,000 h. p.) the mean-pressures on the bearings have been over 1,200 lbs. per sq. inch, or over half-a-ton. These are under actual ordinary sea operating conditions, so it is no wonder that in some cases the wearing of the bearings with different designs and types of engines have varied from 1/128th of an inch in ten months, to ¼ inch in five days respectively.

This is such an enormous variance that it more than fully illustrates the absolute necessity of careful study when designing bearings, and the lubrication of bearings, of marine Diesel engines. Hence, designers always should avoid high powers for their first few attempts to produce a mercantile marine Diesel engine, and make their

METHOD OF GETTING AT THE CROSSHEAD, CROSSHEAD GUIDES, AND BIG END BEARINGS OF THE BURMEISTER & WAIN MARINE DIESEL ENGINE, WHICH SHOWS THE IMPORTANCE OF ACCESSIBILITY



EVEN THE ENGINE ROOM AUXILIARY SHOULD BE MADE ACCESSIBLE, AS IT IS IMPORTANT THAT NO VALUABLE TIME SHOULD BE WASTED WHEN SUCH MACHINERY NEEDS ADJUSTING. THESE TWO PICTURES SHOW A WERKSPOOR-DIESEL AUXILIARY LIGHTING SET, AND ILLUSTRATE HOW EVERY WORKING PART CAN EASILY BE GOT AT BY REMOVING A SINGLE STEEL PLATE

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progress step by step, cautiously feeling their way instead of blindly rushing along in the dark and eventually coming a cropper over the first big obstacle. The path to success is a long, difficult, and tedious one, and needs unlimited determination and inexhaustive patience.

Accessibility, too, is a feature often insufficiently considered by designers, and every designer should first go to sea in the engine-room of some ship and obtain first-hand knowledge of the conditions down below. Then he can better judge for himself how important it is that everything should be done to lessen the work of the engineers at such time when overhauls, adjustments, and repairs are made. When a vessel reaches port there always are a few adjustments to be made, whether the ship be steam or motor-driven, and if a certain job can be done in three hours with one design, and if the same operation requires twenty hours with another design, there is no doubt which motor the engineers will praise, for even engineers are human and will recommend the motor that enables them to spend the longest time ashore.

MARINE PIPE AND MACHINE WORKS BUILD LARGE PLANT.

The Marine Pipe & Machine Works, who have for a number of years been operating at their plant on Railroad Avenue in Seattle, and who have for several months been manufacturing the Sumner heavy oil marine engine for the H. W. Sumner Co., have outgrown their present location, where the last four months three shifts have been working night and day trying to keep up with orders for Sumner engines. A site for the new plant has been chosen at the junction of Spokane and Whatcom Streets, in the heart of Seattle's new industrial district. This new plant will have a floor space of 24,000 sq. ft. and will be equipped with new tools of sufficient size to manufacture all the parts for this engine. An electric crane of 10 tons capacity has been ordered. An erecting platform with a capacity for eight engines is to be built. The new factory will have splendid facilities for handling shipments—a spur from the Northern Pacific is built to the main buildings.

Among the engines built by this concern are the two for the motor auxiliary "Santino," two to be installed on Gray's Harbor, three sets of two each for the Olympia Shipbuilding Company. These are all to be of the standard size, 350 h. p. A steam engine of 1,200 h. p. is also being built for the Anderson Shipbuilding Company.

The capacity for the new plant will be from 50 to 60 motors a year.

THE A. H. COX & COMPANY, INC.

The A. H. Cox & Co., Inc., of Seattle is one of the business houses which had foresight enough a few years ago to stock up on ship and shipbuilders' tools and as a result they are in the front rank of supply houses today. This company three years ago started in their present location and within a year were compelled to double their stock. From that time until now their business has been increasing from day to day. Much of their success has been due to this foresight in placing orders for stock covering a very complete line of tools and equipment. All makes of motors are handled by them in all sizes. They have secured manufacturers' agencies for practically all types and makes of tools.

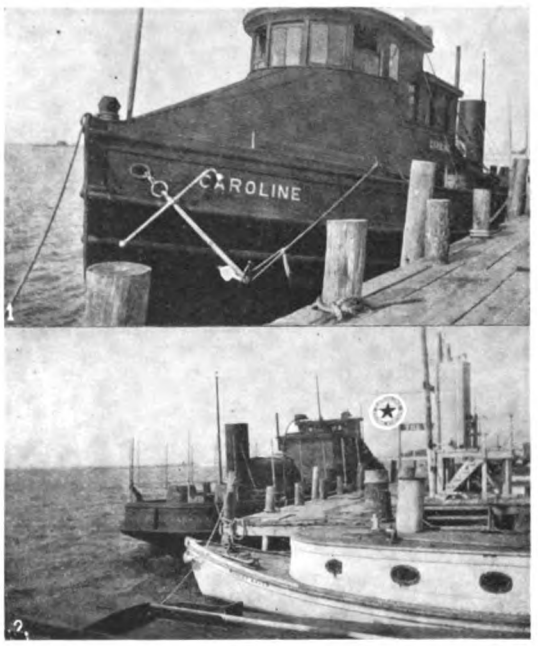
Motors and equipment have been supplied by this company to nearly all the shipyards of the Pacific Northwest. For the new Meachim & Babcock Company an order was placed with this company for complete equipment. Two large gantry cranes, one derrick, one Stetson Ross bevel planer, one bolt header, one oil furnace, band-saws, pipe-threading machines, air compressors, pneumatic tools, etc., were supplied this company by the A. H. Cox Co. The motors for the Sloan Shipyards Corporation and the National Shipbuilding Company, as well as the pneumatic tools for the latter company, were supplied by them. Air compressors have been supplied to the Washington Shipping Corporation, Hoflus Steel Equipment Company and the John Wilson Shipyards by them.

CRAMP COMPANY'S OPERATIONS.

The Cramp Shipbuilding Company, Philadelphia, who have acquired a license to build Burmeister and Wain Deisel engines, now has six thousand employees on their pay roll, and the plant is working overtime. There are over $25,000,000 of unfilled orders on their books.

MOTOR TUG "CAROLINE" ON LONG VOYAGE.

The hot-bulb-engined motor tugboat "Caroline," formerly of New York, engaged in harbor towing, has just successfully completed the long run from New York to Mariel, Cuba, a 1,500-mile trip, at which port the vessel now hails from. She is 65 feet long, 18 feet beam, and draws 5½ feet water. The propelling machinery is two seventy-five horsepower Remington hot-bulb, four-cylinder, heavy-oil engines, driving twin screws, and the



MOTOR TUG "CAROLINE"

1.—Showing turtle-back on forward deck, and stays to top of pilot-house built for the 1,500-mile trip.
2.—"Caroline" at Beaufort, N. C.

vessel is capable of a speed of about eleven knots, in addition to being a powerful towboat. Tanks to hold 1,600 gallons of fuel are fitted. The turtle back on the forward deck was put on by the insurance company for the open sea trip. The boat started on her long voyage in February, and met storm after storm, all of which she successfully rode out, sometimes far out at sea. The boat is now in service at Mariel towing barges of copper ore out to sea to the ships, there being no docks there.

ITALIAN GOVERNMENT ENCOURAGES MOTORSHIPS.

On May 21st last a new decree was added by the Italian government to the previous facilities for the purchase and construction of ships. The following are a few clauses from this decree, and will illustrate the splendid encouragement that is being given by the Italian authorities to motorship development. The decree took effect on the above date. Apparently bounties toward the construction of motorships and oil engines have been given since July 13th, 1911.

Wooden sailing vessels over 100 tons gross and under 15 years old, with or without auxiliary engines, purchased abroad and entered in the Italian Mercantile Marine within two years from the date of this decree, will be exempted from income-tax and war supertax for a period of three years after they commence to trade under the Italian Mercantile flag.

The same exemption will be allowed for the importation from abroad of motors, and auxiliary engines, and for the material required for their construction in the State.

For the construction in the State of motors and auxiliary engines, the bounties granted under Article 8 of the law of July 13, 1911, No. 745, hold good.

For sailing vessels fitted with auxiliary engines, the duration of the exemption is extended to four years.

Sailing vessels of 1,000 tons gross or over which, after the date of this decree, have been fitted with auxiliary motors able to drive the hulls at the rate of five knots, will be entitled to the fiscal exemptions indicated in the first paragraph of this decree.

The engines themselves which may have been bought from abroad will be admitted free of duty.

The regulations contemplated in paragraph 7 of the decree of Aug. 8, 1916, are extended to the transport of building materials, motors, and auxiliary engines.

GYROSCOPE FOR DIESEL YACHT.

The American-built and American-owned Diesel-engined yacht "Aramis," which is the largest vessel of this type in existence, has installed in her engine-room a large Sperry gyroscopic stabilizer. This will keep the ship on an even keel even under the worst conditions of the weather. It weighs about three tons, and consists of two main parts—the main gyro and a small auxiliary one. Before the ship moves in response to the disturbing force of a wave there is a slight lag. This time lag is used by the small gyro, which is so sensitive that it detects the roll of a fraction of a degree. The motion of the small gyro gets under way or "precesses" the main gyro, thereby setting up counter forces which balance this disturbance, or tendency of the ship to movement due to the wave. The instant there is the slightest response of the ship to the rolling action of the wave, the small control gyro detects it, and by its movement closes a circuit which immediately releases a brake and starts the precession motor, whose function it is to rotate the main gyro about its axis. This motor by means of worm and wheel, rotates a pinion, which engages the large precession gear, and thereby turns, or precesses the main gyro. The turning of the main gyro brings into play a force which acts directly against the force of the wave. The gyro precesses slowly until the wave has passed, when the contact is broken, and the brake immediately set, thereby preventing further precession. The control gyro is then conditioned to detect the next wave and cause the main gyro to "precess" in the proper direction to oppose the rolling tendency.—Syrene and Shipping Illustrated.

MOTORSHIP "VALPARAISO" READY FOR SEA.

The Nordstjernan motorship "Valparaiso," completed in April by Burmeister and Wain, is a steel vessel 370 feet long, 52 feet beam and 35 feet deep to the shelter deck. The motive power is developed by two Burmeister and Wain motors developing 2,000 h. p. and giving a speed of 11 knots. There are two auxiliary motors for driving the deck engines and equipment. Electric cargo hoists are installed—ten in number—of five tons capacity. An electric steering gear is also installed.

SCHOONER YACHT "GERMANIA" SOLD.

By order of the Marshal of the British Admiralty the schooner yacht "Germania" ex "Meteor III" has been sold. She is fitted with a 50 h. p. Krupp Diesel engine as auxiliary power and originally was owned by the Kaiser. She cost $225,000.00, but Capt. Hannevig of Christiania secured her for $50,000.00.

STEPPED-PISTON DESIGN ABANDONED.

The A. B. Diesels Motorer of Stockholm, builders of the marine Polar-Diesel engine, have abandoned the stepped-piston design, and with latest high-powered motors the air-compressors are driven off the crossheads by rocking beam levers, as are three auxiliary scavenging pumps. The F. I. A. T. company of Turin also have abandoned the stepped-piston, as did Doxfords of Sunderland.

DOLLAR COMPANY BUYS MOTORSHIP.

At last the Robert Dollar Company has made its first step into the motorshipping world, having purchased the auxiliary schooner "May," which now is building at Astoria. She will carry 1,750,000 ft. of lumber.

MOTORSHIP TO CARRY STEAMER.

The new Danish-built Diesel-driven motorship "George Washington" will carry to India a stern-wheel steamer that recently was completed at Yarrow's yard, Victoria, B. C. The hull of the steamer is being shipped knocked down in crates, while the boilers and engines will be shipped from Yarrow's principal works in England. Yarrow's are licensees for the Nürnberg marine Diesel-type engine.

ANOTHER SUBMARINE ENGINE BUILDER.

We have pleasure in making the first announcement that Swan, Hunter & Wigham Richardson, Ltd., of Wallsend-on-Tyne, have taken up the construction of Diesel-type submarine engines, in addition to having made considerable progress with their mercantile-marine type of Diesel engine.

DEATH OF T. R. JOB.

We regret to announce the recent death of Mr. T. R. Job of Job Bros., shipowners of New York and Liverpool. Mr. Job was an ardent supporter of the oil-engined auxiliary ship, yet he was of the old school, being 81 years of age, and started in business 50 years ago.

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NAUTICAL GAZETTE UNDER NEW MANAGEMENT.

America's oldest shipping journal, The Nautical Gazette, has been acquired by the New York Evening Post Company and appears under new management. The title of the publishing company remains The Nautical Gazette, Inc. Oswald Garrison Villard is president, Emil M. Scholz is vice-president and treasurer, Robert B. McClean is secretary. Walter B. Hayward, city editor and for years a writer for The Evening Post, is the supervising editor of the Nautical Gazette. James Gray, who for the past year has been editor and one of the owners of the Gazette, remains with the paper as assistant editor.

Established July 1, 1871, at 39 Park Row, by Osbon & Breck, The Nautical Gazette was for eight years virtually the only American publication in the field of the shipping trade. Its first editorial declared its purpose to be "to make the Nautical Gazette the most valuable, trustworthy and interesting newspaper of its class published in America, controlled by no clique and having American shipping interests at heart. We shall do all that is in our power to advance these interests and to assist in every proper effort to place our commerce on a footing commensurate with our standing among the nations of the world."

Published at first as a weekly and later, as now, as a semi-monthly, The Nautical Gazette in the 46 years of its existence has never missed an issue. For seventeen years Captain B. S. Osbon, a nautical man of wide and varied experience, guided its destinies. It has then made what it yet remains—an enterprising journal of navigation, shipbuilding, marine engineering, naval architecture and commerce. Prior to retirement in 1916 on account of his health, J. W. Dawson Stearns was for a number of years its editor.

Assured of the strong and aggressive backing of its new owners, The Nautical Gazette enters on a career of enhanced usefulness and enlarged influence. At no time in history was shipping so important to world welfare as now, and hence the event is especially auspicious. The size of the paper will be increased, its typography will be improved and it is planned at some time in the not distant future to publish it weekly instead of semi-monthly.

AUXILIARY SCHOONER "STJARNAN."

There recently was completed at the yard of F. F. Bingham, Pensacola, Fla., the wooden-built motor auxiliary-schooner "Stjarnan," in which is installed two Fairbanks-Morse surface-ignition oil engines. Her principal dimensions are:

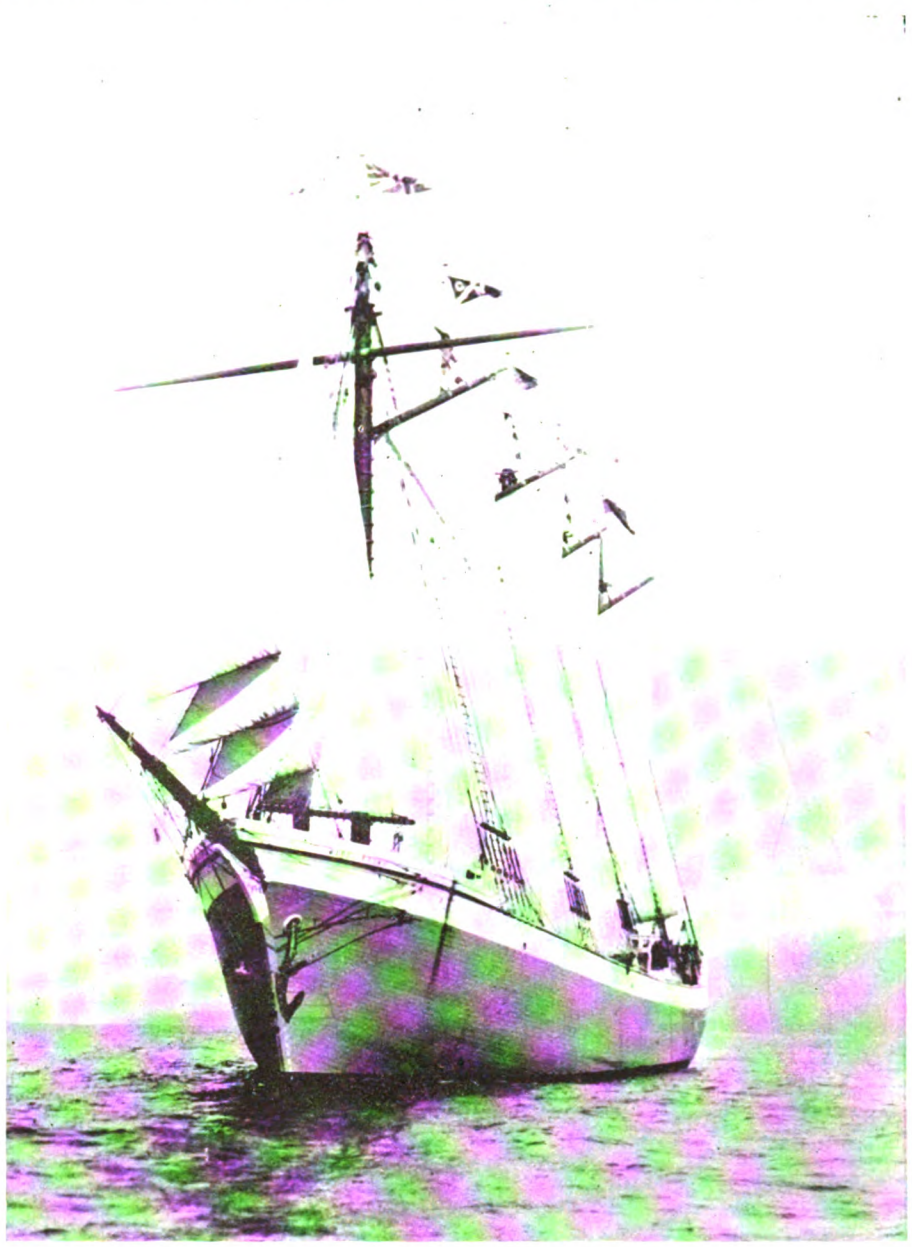
Dead weight capacity	575 tons
Gross tonnage	304 tons
Length	135 ft.
Beam	30 ft.
Moulded depth	10 ft.
Power	Two 45 h.p. motors
Speed under power alone	6 knots
Launched	Apr. 25, 1917

Building at the same yard is an auxiliary schooner of 650 tons d. w. c., and 350 gross tons, in which two 60 h. p. Fairbanks-Morse oil engines will be installed. This vessel is 146 ft. long by 30 ft. breadth, and 10 ft. moulded depth, and will be launched during August of this year.

BRITISH SHIPPING PROFITS.

In 1916 the net profits on British shipping were $675,000,000.00, compared with $100,000,000.00 in 1913, or an increase of nearly 700 per cent. This is according to Major Hunt, M. P., in an assertion in the House of Commons.

Canadian Government Subsidizes Motor Auxiliaries



MOTOR AUXILIARY SCHOONER "MABEL BROWN"

Length 225 ft.; beam 44 ft.; depth 23 ft.; D. W. capacity 2·250 tons; H. H. Brown, owner, Vancouver, B. C.

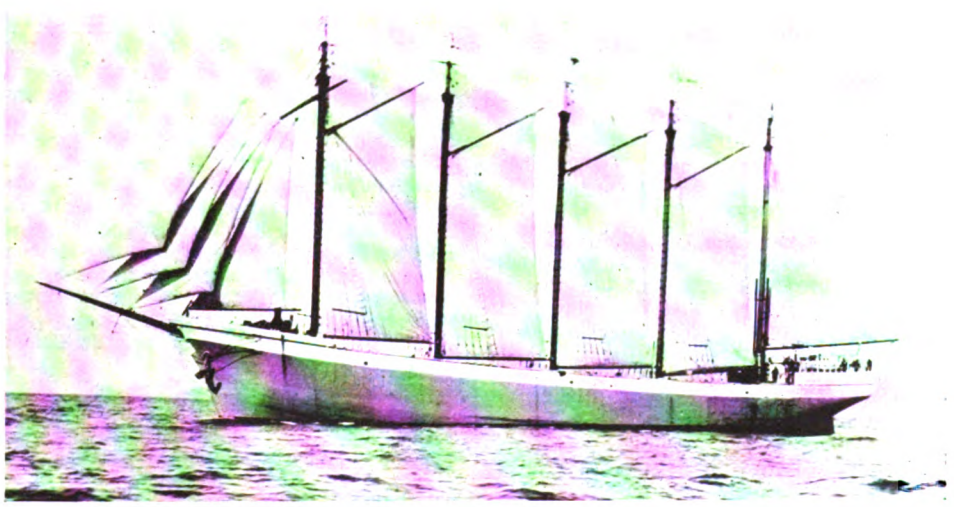
THE apparent indifference of the U. S. Shipping Board to the use of the marine-internal-combustion oil-engine is somewhat at variance with the attitude of the Canadian Government, who are subsidizing motor-driven vessels. We are enabled to give a couple of views of one of twelve wooden motor-auxiliaries built and building to the order of H. W. Brown & Co., of Vancouver, B. C., under Government subsidy. This ship is the "Mabel Brown,"—a five-masted schooner of 2,250 tons dead-weight-capacity, and fitted with two Bolinder four-cylinder surface-ignition-type heavy oil engines, each of 160 b. h. p. Her dimensions are, length 225 ft., beam 44 ft., moulded depth 23 ft.

Here we may pass a few apt remarks. If the motors are genuinely used as auxiliary-to-the-sails the power is sufficient, but if the sails are auxiliary-to-the-engines she is without doubt underpowered. The non-success of several auxiliaries has been due to the fact that when such vessels were ordered, owners intended to use the motors for getting in and out of harbors and for docking; but after the vessels were in service the captains receive instructions to use the engines continuously, which, of course, is quite unfair to the machinery.

In Canada the strongest supporters of marine oil engines for the propulsion of wooden ships has been the Canada West Coast Navigation Company, who recently have built or have under construction, a fleet of eight auxiliaries as follows:

Name	Length O. A.	Height Keel	Breadth	Depth of Hold	D.W.C. tons
Mabel Brown	260 ft.	225 ft.	44 ft.	19 ft.	2,500
Geraldine Wolvin	260 ft.	225 ft.	44 ft.	19 ft.	2,500
Jessie Norcross	260 ft.	225 ft.	44 ft.	19 ft.	2,500
Marie Bernard	260 ft.	225 ft.	44 ft.	19 ft.	2,500
Mabel Stewart	260 ft.	225 ft.	44 ft.	19 ft.	2,500
Janey Carruthers	260 ft.	225 ft.	44 ft.	19 ft.	2,500
Margaret Haney	260 ft.	225 ft.	44 ft.	19 ft.	2,500
Laurel Whelan	260 ft.	225 ft.	44 ft.	19 ft.	2,500

These vessels are bald-headed schooners and carry about 17,000 sq .ft. canvas, in addition to being fitted with two 160 b. h. p. Bolinders surface-ignition oil engines. Personally we think that these vessels are under-powered and that two 300-400 b. h. p. motors should have been installed, because the motors are sure to be used constantly, which, of course, is too much work to expect from engines which are not meant to drive the boat at any substantial and prolonged speed. The engines are there and doubtless the crew, if



MOTOR AUXILIARY SCHOONER "MABEL BROWN"
Twin 160 b. h. p. Bolinders

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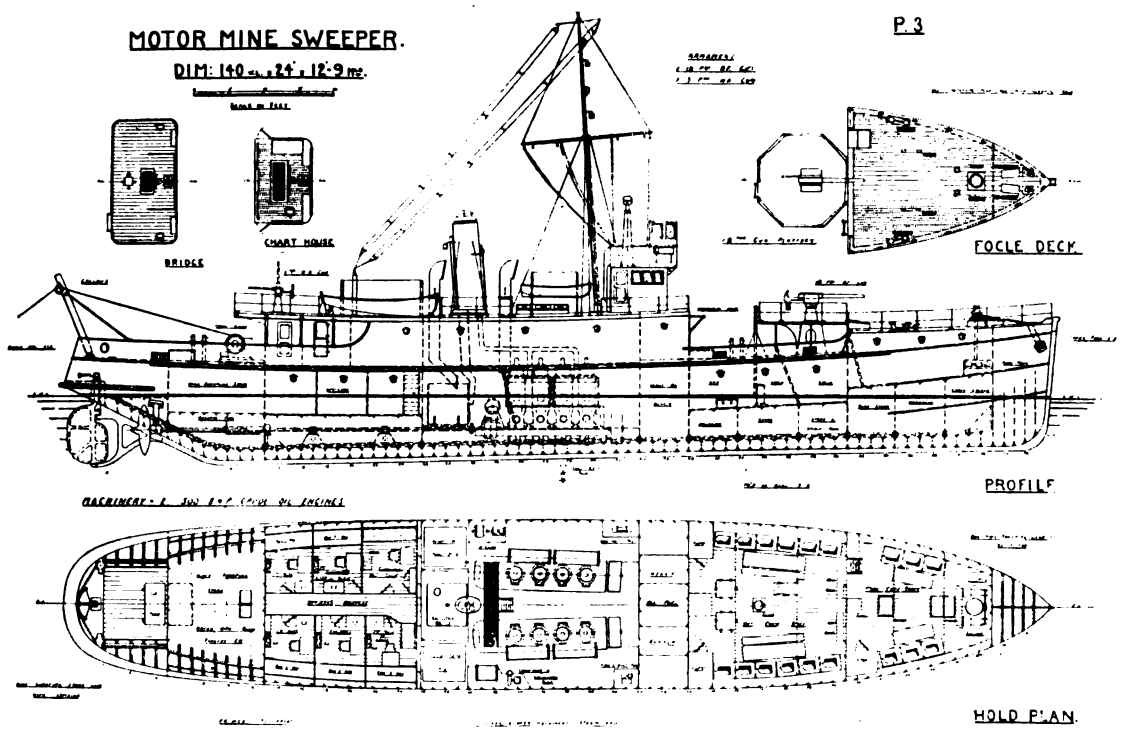
New Plan for British Motor Mine Sweeper



The accompanying illustration shows a type of craft that should prove interesting at the present time—a heavy-oil engined motor mine sweeper. She was designed by Messrs. Courtney and Paul of Southampton, England. Her propelling machinery consists of two heavy-oil engines of the British Kromhout type of 500 b. h. p. driving twin screws. She is also designed to meet the requirements of a patrol boat.

She is equipped with a motor lighting set, a steam-driven fresh water and sanitary pump, a fire and bilge pump (also steam driven), a condenser and circulating pump. Steam, for the capstan on the main deck forward, the trawl winch aft, and the engine room auxiliaries, is supplied from an oil-fueled boiler placed at the after end of the engine room.

The fuel-oil is carried in three compartments, a cross bunker forward of the engine-room, a ready-to-use tank in the engine room and a reserve tank aft. The exhausts from the main engines and the lighting set are led out through the funnel, which also takes the place of the auxiliary boiler funnel.

On her decks are mounted an 18-pounder quick-firing gun forward and a 3-pounder high altitude gun at the after end of the bridge deck. The magazine is forward of the fuel bunker, being easily accessible to the forward gun position. A derrick hoist is fitted to expedite the handling of the ammunition. A mine sweeping store room is situated aft, and a powerful trawl winch provided for working the gear and the mine sweeping apparatus, etc., being arranged under the main deck aft and also easily accessible. A powerful searchlight is fitted in place on the bridge close to the steering position and engine controls. The vessel has a long-distance wireless outfit aboard.

The officers' quarters are located aft and consist of separate cabins for the commander, first mate, second mate, engineer and third mate. The crew are berthed under the foc'sle and main deck. The officers' mess is on the main deck, together with the galley pantry and lavatories.

The vessel is intended to be made of steel, with scantlings in access of the regular practice, while the watertight bulkheads have been given especial attention. Ten of these are fitted, the lower portions of four of them being made oiltight with oiltight flats forming oil-fuel tanks, as can be seen from the illustration. The keel is formed of bulb section 8" by 1½".—"The Motorship and Motorboat," London, E. C.

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not the owners, will expect them to do the work of machinery of a full-powered ship of this size.

Carrying Capacity	Bunker Capacity	No. of Crew	Power	Cost
1,600,000 ft.	800 barrels	15	320 bhp	$200,000.00
1,600,000 ft.	800 barrels	15	320 bhp	$200,000.00
1,600,000 ft.	800 barrels	15	320 bhp	$200,000.00
1,600,000 ft.	800 barrels	15	320 bhp	$200,000.00
1,600,000 ft.	800 barrels	15	320 bhp	$200,000.00
1,600,000 ft.	800 barrels	15	320 bhp	$200,000.00
1,600,000 ft.	800 barrels	15	320 bhp	$200,000.00

NEW DANISH OIL ENGINE.

A very striking looking surface-ignition oil engine has been produced by the Hera Motor Works of Copenhagen, Denmark. It is of the two-stroke type with solid injection at 500 lbs. per sq. inch. It is known as the Hera oil engine.

FOUR NEW WERKSPOOR-DIESEL MOTORSHIPS.

Four large ships have recently been purchased by the Anglo-Saxon Petroleum Co. The existing machinery is to be removed and replaced with Werkspoor-Diesel crude-oil engines of the four-cycle type.

TYPES OF CYLINDER COVERS.

Various kinds of metals have been used for the cylinder heads of the Krupp engines of the M. S. "Glenpool," Ex-"Hagen," owned by the Standard Oil company, of New Jersey. Cast iron, special cannon steel and manganese bronze all have been tried, and we understand the latter metal now is in use.

WAITING FOR ENGINES.

The builders of the latest addition to the McCormick fleet, the "City of St. Helens," are halted in the finishing of the vessel by the non-arrival of the engines, which are on the way. The "City of St. Helens" is about the same size as the "S. I. Allard," being 285 feet over all, 48 feet in breadth and with a depth of hold of 23 feet. She will be powered with two 320 h. p. Bolinder engines, burning Standard Oil Company's Calol, 24° Beaume.

MOTORSHIP BRINGS HEAVY CARGO.

The motorship "Australien" has lately arrived from Vladivostok with a cargo of 8,400 tons of soya beans for the East-Asiatic Co., Ltd. After discharging a portion of her cargo she proceeded down the coast to San Pedro, where she finished unloading, and is due to arrive here again within a few days. The "Australien" was built at Copenhagen in the shipyards of Burmeister and Wain, and is equipped with all the most modern appliances for handling freight quickly and cheaply. Her gross tonnage is 5,395 tons and her dead weight capacity, including coal bunkers, is 9,275 tons. She is 410 feet in length, by 55 feet beam, with a moulded depth of 35 feet and a mean load draft of 26.5 feet. In the matter of propelling power she is powered with two 4-cylinder Diesel engines developing 3,200 h. p., giving her an average speed when loaded of 11½ nautical miles an hour. In the early days of August another motorship belonging to the same company, the "Selandia," is due to arrive "at an American port"—as the daily press announces shipping events, since our entry into the war.

MOTOR-DRIVEN HOSPITAL SHIP.

Now operating on the Tigris is an interesting hospital ship, which was built in Great Britain, shipped in sections to India, and re-erected. We refer to the M. H. S. "Nabha," a steel-built vessel 150 ft. long by 30 ft. breadth, and 3 ft. mean draught, and which has a speed of nine knots on a displacement of about 240 tons.

The hull is of the shallow-draught class, so that the twin propellers operate in tunnels. Her machinery consists of two Thornycroft six cylinder kerosene motors each of 150 b. h. p. All the auxiliaries are electrical-driven, for which purpose there are two 47 b. h. p. Thornycroft kerosene motors driving 28 k. w. at 110 volts generating sets. There also is a 22 h. p. kerosene motor driving an ice plant. In the cabins are forty electric fans. From Bombay where her trials were run she cruised under power to Basrah.

ANOTHER BOLINDER INSTALLATION.

The motorship "Santa Isabel," the latest of the W. R. Grace Company fleet of motorships, which was recently launched at Hoquiam, Wash., is a sister ship of the "Santa Elena," having a length of 230 feet. She will be equipped with twin 320 b. h. p. Bolinder engines in San Francisco.

SUBMARINE CHASERS TO BE READY SHORTLY.

By the first of January the United States Government will have completed and in the water ready for service 300 100-foot submarine chasers. The first lot of these boats will be delivered to the government in August and will consist of twenty-five craft. In September fifty more will be turned over completed. Seventy-five will be delivered in October, 100 in November, and the remainder in December.

MOTORSHIP "CEARA."

The motorship "Ceara," a large floating dock and tender, constructed for the Brazilian Navy by Messrs. Gio. Ansaldo and Company of Genoa, Italy, has arrived at Pernambuco, Brazil. The "Ceara" has a length between perpendiculars of 100 metres, a beam of 15.5 metres and a depth of 8.2 meters. She is equipped with two combustion motors burning heavy oil, of the San Fiat Georgio type, which develop 2,250 h. p. at 130 revs.; vertical type, six cylinders and two stroke.

THE DIESEL MOTORSHIP "ALABAMA."

Very soon the full-powered motorship "Alabama" will be in service, and she probably will be the first vessel to be equipped with a McIntosh & Seymour Diesel engine. She is a twin-screw ship, 270 ft. long, with 46 ft. breadth, and 26 ft. depth of hold, and will be driven by two oil motors aggregating 1,250 i. h. p. Her owners are the Alaska-Pacific Navigation Co.

WORKING OVERTIME TO FILL ORDERS.

The Dow Pump and Diesel Engine Co., of Alameda, Cal., is working twenty-four hours each day to keep up with the orders piling up in the office. Libby, McNeill and Libby are having built at the company's plant in Alameda two sets of reversible, full-powered Diesel engines for installment in a vessel that is being built for them in Seattle. The company also is in receipt of an initial order of 300 marine pumps from the United States Shipping Corporation for use on the first unit of the emergency merchant fleet to be built under the direction of General Goethals and his associates. These are only samples of the activity going on at the company's plant.

AUXILIARY SCHOONER FOR LUMBER COMPANY.

The auxiliary schooner "Frank D. Stout," bound from Coos Bay, Ore., to San Francisco with a cargo of lumber, is being towed to San Francisco, as her engines await her at San Francisco, where they will be installed. The vessel was recently built at the yards of the Chas. R. McCormick Co., at St. Helens, on the Columbia River, and she is destined for the lumber trade, having a capacity of 800,000 feet of lumber. Her dimensions are 200 feet in length, 43 feet beam, with a moulded depth of 18 feet. She will be full-powered with Bolinder engines, the installation of which will be supervised by the owners, the California and Oregon Lumber Co.

ENGINEER-IN-CHIEF OF BRITISH NAVY.

Rear-Admiral George G. Goodwin, C. B., has been appointed Engineer-in-Chief of the British Royal Navy, with the rank of Engineer Vice-Admiral. He succeeds Sir Henry J. Oram, K. C. B., F. R. S., under whom he has been for the past ten years.

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GERMANY AND HER SUBMARINE ENGINES.

A writer in an English contemporary gives some interesting information regarding the submarine engines used in the German Navy up to the commencement of the war, which information confirms our own impressions received from data gained in other directions. The Britisher in question was in the Krupp works up to one month before the war and had opportunities for gathering information first hand.

"It was then admitted," he says, "that the Krupp two-cycle submarine-engine was a fiasco, and that their engine was taken over under conditions that no other firm could have obtained, the Krupp firm having "got the German Admiralty by the ears." The cost of these motors to the German Admiralty was $20.00 per h. p. more than that asked by other builders. It was heavier, required more space, gave less power, and gave more trouble than many other engines available, while the fuel consumption was 0.53 lbs. per b. h. p. hour when other companies were prepared to guarantee 0.48 lbs. At the outbreak of war, Krupps had under construction 75 engines aggregating 78,800 b. h. p., the largest set being eight motors, each of 1,500 b. h. p., for the Russian Navy.

"Furthermore, the Augsburg (M. A. N.) four-cycle engine of 850 b. h. p. was a highly successful and reliable machine, being easily the best in Germany and the second to none in the world. It was lighter, gave a lower fuel consumption and occupied less space than any other, yet was not encouraged to the extent it should have been by the German Admiralty because of the strong "pull" that Krupps had with the naval heads.

"But, it is most important to note that the Navy desired to keep the engine for its use only, and this Augsburg engine never was licensed to be built by any other company inside or outside of Germany." It is fairly safe to assume that had the U. S. A. licensees secured a license from the Augsburg branch of the M. A. N. instead of from the Nürnburg works of the M. A. N. they would still be building from European designs instead of being obliged to change to a design of their own.

As the British writer puts it, "At Nürnburg only two-cycle engines are built, and although much trouble has been experienced the engines were more or less reliable. Alterations and improvements were in progress all the time, and it is questionable if two consecutive orders for a certain size of engine were even exactly alike."

All these statements bear out the remarks made in the submarine engine article published in April Motorship.

SHIPPING BOARD'S PLANS.

As a war measure the Government has adopted the policy of discouraging the publication of information that might aid the enemy in their plans, and as a result the United States Shipping Board is not able to give out for publication any information regarding contracts, size and character of vessels, etc. This is the text of circular letter No. 10 sent out by General Goethals, general manager of the Emergency Fleet Corporation. In order, however, that manufacturers of supplies and persons who are in a position to furnish materials in connection with ship construction work may be placed in touch with the contractors, the district officers have been instructed as to the proper course to pursue, and the various manufacturers should get in touch with them.

In this regard the Emergency Fleet Corporation has issued a list of names together with the territory covered by the various district officers of the United States Shipping Board. These names are:

W. H. Hand, Jr., Custom House, Boston, Mass. East Massachusetts to Maine, inclusive.

Eads Johnson, 115 Broadway, New York, N. Y. New Jersey (outside the Delaware River), New York and to East Massachusetts.

G. R. McDermott, Room 302, 1319 F. Street, N. W., Washington, D. C. Chesapeake and Delaware, and Atlantic Coast from Philadelphia to Norfolk.

W. C. McGowan, 505 Heard Bldg., Jacksonville, Fla. North Carolina, South Carolina, Georgia, Atlantic and Gulf Coast lines of Florida to and including the Apalachicola River on the west.

Warren Johnson, 817-18-19 Hibernia Bank Bldg., New Orleans, La. From the Apalachicola River on the east to but not including the Mississippi River on the west.

Chas. N. Crowell, 1316 Carter Bldg., Houston, Texas. Texas and the Mississippi River.

A. F. Pillsbury, 310 Sansome Bldg., San Francisco, Cal. Pacific Coast.

John F. Blain (under Capt. Pillsbury), Securities Bldg., Seattle, Wash. Seattle and vicinity.

Auto Ferrying on the Mississippi

The automobile is proving a gold mine to the ferrymen of the Mississippi. There are few bridges, except between cities, across the two thousand mile length of the nation's greatest river. Yet, to motor from one-half of the United States to the other, the broad expanse of the Father of Waters must be crossed—there is no getting around it.

Since emigration set in west of the Mississippi ferrying has always been an important feature of freight and passenger carrying on the Mississippi. In ante-railroad days it was big business and the old-timers tell interesting stories of the great barges piled high with emigrants, household goods, cattle, horses, pigs and chickens that were ferried over in an unending stream at the principal points of crossing.

MOTOR FERRY "ROB ROY," 15 H. P. KEROSENE ENGINE

With the coming of the railroad ferrying declined along with the packet and freight business of the big steamship lines. Yet every village continued to maintain at least one ferry line and the larger towns and cities many of them. The business has been fairly lucrative but the popularity motor touring has achieved the last few years has made it a bonanza. Men are vying with each other at all the towns for ferry franchises. Those who obtain them are on the road to wealth.

In past years the ferryboats were the old double-deck steamers. Now practically every one of the hundreds of ferries on the Mississippi are powered with oil engines. Though much smaller than the old type, with the barges for autos they tow, they have a larger capacity than the old side wheelers.

A main point of crossing on the Upper Mississippi since earliest days has been between the historic Wisconsin town of Prairie du Chein and McGregor, Iowa. Back in the forties a mule boat was operated between the two towns and the captain carried his fares in his boots. From the mule boat the next step was to steamer and several of these in succession served as ferry. Twelve years ago George F. Freeman, "Captain Freeman," received the ferry franchise and put on the first motorboat. He has carried on the business ever since. His present carrier, the "Rob Roy," is considered one of the pattern ferryboats of the river and probably is doing as heavy if not a heavier business than any other on the Upper Mississippi.

The photograph shows the "Rob Roy" towing auto barge. The boat measures forty-five feet in length and ten feet wide. It is propelled by a stern paddle wheel. The engine is a 15-horse-power kerosene stationary engine manufactured by the Worthington Pump and Machinery Corporation of New York. It is set up so that it can be handled from the pilot house by levers running to the clutches. A straight belt and cross belt are used, making it possible for the pilot to both reverse and go ahead. A crew of only two men is required. Two barges for autos are used, one 14 by 51 with a capacity of eight cars, the other 10 by 50, capacity four cars. The boat can tow both barges nicely at the same time. It is a three-mile stretch across the Mississippi from one ferry landing to another. Seven round-trips are made daily.

During the summer of 1916 a thousand cars were taken across, many of them from far-distant points. Nearly every state was represented, for the crossing is on the direct motoring line from Chicago to northern Iowa, Minnesota, the Dakotas and the Northwest. From Chicago to Milwaukee, Madison and Prairie du Chien the motorist follows the Red Cross trail. From McGregor to Sioux Falls stretches the North Iowa Pike. Both trails are well-marked. The North Iowa Pike connects up with the Yellowstone Trail to the Northwest. Out of McGregor it follows the old military and emigrant trail into Minnesota. In early days when the emigrants disembarked from the ferry at the McGregor Landing they stopped at a tavern with an inscription over the door, "Eat, drink and be merry, for to-morrow you go to Minnesota."

Captain Freeman of the "Rob Roy" expects to carry far more than a thousand cars this season. In fact has already transported as many as fifty in a single morning.

SINKING OF THE STEAM TANKER "MORENI."

In the report of Admiral W. S. Benson of the submarining of the steam-driven tanker "Moreni," Chief-Bo'san's Mate Andrew Copassaki, who was in charge of the naval gun crew, the following remark appears, the attack on the ship taking place several hours later:

"About 1 a. m. June 12 the engines stopped. I was awakened, and asked the captain what was the trouble. He said something was wrong in the engine room, and engines had to be stopped. They remained stopped for about three-quarters of an hour."

This little engine-room incident passes without comment, but we can rest assured that had the "Moreni" been a Diesel-driven motorship, this engine stoppage would have been claimed by many as the real reason for the submarine being able to attack the vessel.

The report continues: "After a half-hour fight we were hit in the gasoline tank aft and a fire started, and about an hour later the fire broke out all over the ship."

Here we might mention that all the time they maintained rapid gun-fire on the submarine with their big after gun. To use the gunner's words:

"During the fight, which lasted a little over two hours, we fired about 150 shots, but, as the steering gear was shot away, and the ship was going around in circles, we could get no range. The submarine fired about 200 shots while we were on the 'Moreni,' of which about forty-five found their mark."

To us this indicates the foolishness of using 86-foot motorboats to chase and sink submarines, and comprises the necessity of larger craft.

THE RELIABILITY OF STEAM!

For more than 80 years no shipowner dreamt of sending a steam-driven vessel to sea on a long voyage without a considerable amount of auxiliary canvas, yet after a couple of years experience owners of Diesel-driven motorships have so much confidence in the oil engine that they would not think of carrying auxiliary canvas on a full-powered motorship.

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Sidelights on the Cost of Repairs to Motorships

The Real Truth of the Situation, Which Should Be Read by All Shipowners

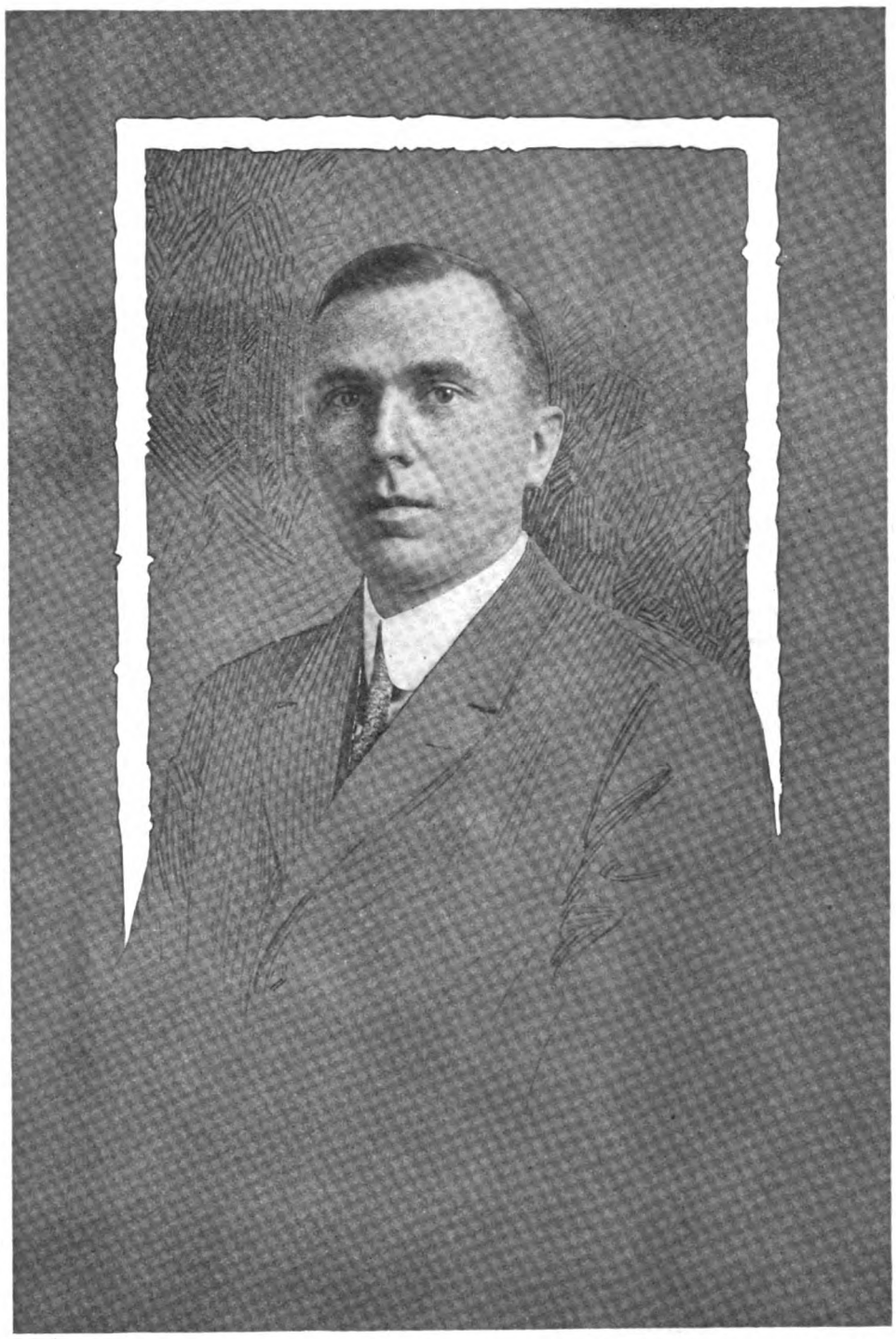
THERE are many people in the shipping business who will talk glibly about the enormous repair bills that all owners of motorships have to face; yet when pressed for facts and definite information rarely are able to furnish the same, and one generally discovers that they merely have heard this-and-that. Nevertheless, the harm is done, and consequently a few incidental cases may cause many persons to brand without discrimination all motorships as being unreliable. It is a part of Motorship's work to hide nothing; but rather to reveal all motorship mishaps and their true causes in order that the remedy may be found where needed, and thus establish shipowners' confidence in the reliability of the marine oil-engine in its proper form. It also is Motorship's work to publish when possible the repair bills and operating expenses of successful motorships, and so give shipowners a true impression of the facts, and not merely a one-sided and misleading aspect of the real situation. Let us take a number of Diesel-driven motorships about which the owners boldly have come forward with the truth. It is curious to note that most persons will accept as gospel truth any rumor of unreliable working of Diesel ships; but seriously doubt such records as the following. Just a little natural bias against a new principle—that is all—but such bias must be overcome. A few black sheep should not cause condemnation of the entire flock.

For instance, the four-cycle Diesel-engined cargo ship "Siam," a vessel of 9,700 tons d. w. c. and 3,000 i. h. p., on her first voyage, lasting 5½ months, covered nearly 28,000 nautical miles, of which forty (40) days was a continuous run. At the end of this voyage, according to the builder, she spent only six days in her home port discharging cargo, repairing and overhauling. The total repairs for this voyage only cost $296.26, of which amount $126.88 was to the main engines and auxiliaries, the remainder being to the hull, propellers, thrust-bearing and deck machinery. The labor and costs on the engine-room repairs were as follows:

1. All crossheads and guides examined on board	$ 2.25
2. Pistons of main engines removed on board for examination	78.92
3. Seven manometers removed, repaired and justified	14.18
4. Six main-engine exhaust-valve spindles repaired, cast-iron welded on, machined and ground together for the main engines	29.54
5. One auxiliary engine exhaust-valve repaired, as above	1.99
	$126.88

After the second long voyage the repairs were a little higher, amounting to $749.72, of which $240.00 had nothing to do with the engine-room machinery. The "Siam" is of Danish register and is owned by the East Asiatic Company. With such records as the above it is no wonder that they sold all their steamships, and are replacing them as quickly as possible with Diesel-driven motor-vessels.

The cargo ship "Cornelis," of 600 tons, was one of the first coastwise steel-built full-powered motorships, having been placed in service in December, 1910. Between that date and the middle of June, 1916, according to her owners, Messrs. J. Van Rompu, of Terneuzen, Holland, she covered about 90,000 nautical miles—which is very excellent indeed for a small vessel. The engine, a four-stroke-cycle crosshead-type Diesel, is of only 190 b. h. p. at 200 r. p. m., and drives a reversing-propeller. The cost of repairs has been about $500.00 per annum for the main engine and $125.00 for the auxiliaries, and the total time lost awaiting machinery repairs and parts has averaged but three to four weeks per year, during which time dry-docking for painting and bottom scraping was carried out. The "Cornelis" recently was sold to Norway. She is registered with Lloyds.



O. H. FISCHER, MANAGER UNION GAS ENGINE COMPANY OF OAKLAND, CAL., RECENTLY ELECTED PRESIDENT OF THE NATIONAL GAS ENGINE ASSOCIATION AT THE CONVENTION IN JUNE AT CHICAGO.

Speaking of the fleet of large Diesel-driven ships owned by his company, Mr. A. Meyer, the Marine-Superintendent of the Nederlandsche Indische Tankstoombot Company (Dutch East India Tank Ship Co.), stated in a report—we quote him verbatim:

"It might have been reasonably expected that in the course of their first 6 months running defects in the machinery would become manifest, as is mostly the case in new departures of such a radical nature, but somewhat regardless of the apparent risk, these motor-vessels were sent across the North Atlantic and Pacific in the depth of winter as soon as they left the builders' hands, and instructed to perform long-distance runs, which even in the case of a new steamship would not have been quite desirable; **in fact, no discrimination whatever was shown in adjusting the movements of these vessels, which have been treated as if they were ordinary steamers, and perhaps a little more severely.**

"An example of this is that the Diesel ship 'Artemis,' after having been kept running continuously for 8 months, without drydocking since the date she was accepted from the builders, has now been sent on a voyage from the Tyne—to Sydney, Australia, via the Panama Canal, and she completed the voyage in 78 days, including a short stay at Port Arthur.

"It is particularly to be noted that no facilities for repairs to Diesel machinery are available in those parts of the world, **and it may be regarded as a demonstration of the great faith we, as shipowners, have in the absolute reliability of the machinery of these motorvessels.** It is also obvious that on these long-distance runs—where steamer bunkering stations are few and far between—the motorvessel presents an enormous advantage by the comparatively small amount of bunkers required and the large cargoes they carry in comparison with steamers.

"Our Diesel-driven vessels," continues this shipowner, "have been subjected to the most severe tests, and having proved capable of standing these tests better than could reasonably have been expected, **we feel entirely assured of the great success we have attained with these vessels.** They have now gone through their most trying period, and with small adjustments and improvements, introduced the machinery will become more reliable as time goes on. We feel that in spite of disappointments with some Diesel propelled vessels, there is a great future for the marine Diesel engine."

Referring to the Diesel motorship "Selene," the report states that this vessel, which also is owned by the Dutch East India Tank Ship Co., travelled a distance of 40,000 nautical miles between September, 1914, and July 1, 1915. Had she been laid up with repairs she could not possibly have covered this distance. That is obvious!

On her maiden voyage from Port Arthur, the report continues, the "Selene" sailed from Cardiff, England, to Port Arthur, thence via the Panama Canal to Tientsin, North China, the second stage—a 9,000-mile trip—**being covered in 44 days without calling at any port.** This means an average speed of over 8 knots, hour-after-hour, day-after-day, week-after-week, for six weeks. After this performance how can anyone possibly doubt the reliability of the marine Diesel engine? The "Selene" is a vessel of 5,413 tons d. w. c., and of 2,200 i. h. p. Her bunker capacity of 692 tons gives her a radius of 22,800 nautical miles. On one voyage this motorship effected a complete trip around the world, logging approximately 27,500 miles, and only once replenished her fuel bunkers. Sixty-six days were made without bunk-

(Continued on Page 24)

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Guns for Patrol Craft and Chasers

DURING the past few months Motorship has dealt fairly fully with patrol-boats and submarine chasers; but such craft would be of little use, except for scouting, unless they were properly equipped with some sort of suitable armament. Hence, the following details of rapid-firing guns designed for such boats will be of more than usual interest. We give details of two sizes, namely a 3" and a one-pounder, as constructed by the Driggs Ordnance Co., of New York, to whom we are indebted for the illustration.

For actual submarine chasing anything smaller than the 3" gun is of little use, except for blinding the submarine by a lucky, or clever shot smashing the periscope; because, the modern U-boat carries fairly heavy armor, on her decks in addition to being armed with two 4.5 guns, and would not hesitate to even attack a 50 ft. or 60 ft. motor boat armed with a one-pounder, for there would be no doubt as to the result.

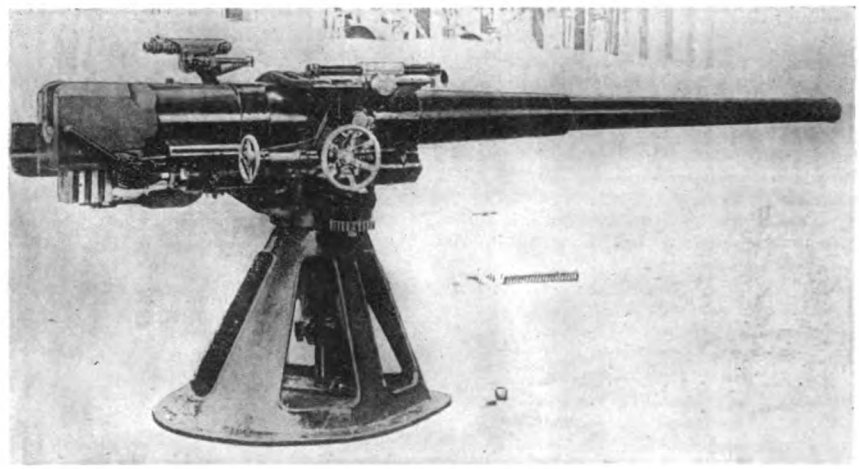
The 3" Gun.

The Driggs 3" semi-automatic gun, after exhaustive competitive tests conducted by the United States Navy Department, was adopted as the standard weapon for the secondary batteries of the United States battleships. In all the essential features of a semi-automatic gun, this gun, say the makers, was far superior to its competitors. In these trials at the U. S. Naval Proving Ground, Indian Head, Md., a rate of fire of 50 shots per minute was made, the test being the firing of a volley of five shots in six seconds. As the projectile weighs 15 pounds, this rate of fire would be equivalent to 750 pounds of steel in one minute.

As no time is lost in opening the breech, this function and the ejection of the cartridge case being performed automatically, the speed of firing is only limited by the speed of loading. The gun pointer is supposed to fire when the cross-wires of the telescope are on the target, and as long as this is the case, and the trigger is held back, the gun will fire automatically as the breech block closes, thus making the rapidity of aimed fire equal to the maximum. The breech mechanism consists of few parts, and these are large and strong. The semi-automatic mechanism has but two working parts. The block is automatically locked in the closed position, preventing any sudden opening of the block in case of hang fire.

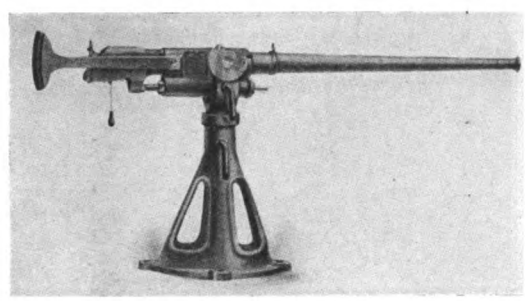
To open the breech mechanism for the insertion of the first cartridge, the operating lever is forced down by hand. It closes automatically when the cartridge case strikes the extractors. After the first shot, no manual labor is required, but that of loading and firing, and if the trigger is held back, the latter operation is also performed automatically. In direct recoil, the stud on the crank end of the operating lever strikes the forward face of the operating cam, and rotating it out of the way passes on. On counter recoil, the cam having returned to its home position, the stud strikes the rear face, and as the cam cannot rotate in this direction, is forced to travel around the cam, thus forcing down the block and the ejecting case. The safety lock, which prevents the premature opening of the breech by hand, does not, however, interfere with the automatic opening of the breech upon counter recoil.

When operated as a hand working gun, the cam is locked in the open position and then one movement only, that of forcing down the operating lever, suffices for operating the mechanism. The operating spring returns the block to the firing position upon inserting the cartridge.



DRIGGS 3-IN. SEMI-AUTOMATIC

Total length of the gun	159 inches
Length of bore in calibers	50 inches
Diameter of bore	3 inches
Weight of gun and mechanism	2,300 pounds
Weight of projectile	15 pounds
Muzzle velocity	2,800 feet per second



DRIGGS ONE-POUND RAPID FIRE

The One-Pounder.

With the idea of ensuring that no special training be required for assembling, dismounting or operating the one-pounder, the design and construction was made very simple. It is made with lengths of both 40 and 50 calibres, and for small patrol-craft the smaller is recommended, this gun firing 30 shots per minute, and has a muzzle velocity (using smokeless powder) of 2,000 ft. per second, although its weight only is about 450 lbs. The extreme range is 5,000 yards and accuracy of fire can be obtained at 3,000 yards. Shock of recoil is absorbed by a hydraulic cylinder, thus easing the strain on deck fastenings.

Regarding the action—to open the breech, the handle is rotated to the rear, thereby, through the operation of a cam movement, the breech block will descend until it is disengaged from the shoulder at the top of the breech recess between the cheeks of the jacket, after which the cartridge is inserted, and the breech closed by rotating the handle smartly to the front until it comes to a stop.

DIESEL ENGINES FOR GOVERNMENT SHIPS

That it may still be entirely feasible to equip the great government fleet of cargo vessels now under way or planned with motor power, rather than the less effective steam power, is the view of B. Mills, superintendent of engineers for the American-Hawaiian line. Mr. Mills has expressed his ideas on the subject in a statement for the New York "Evening Mail," which appears below.

Mr. Mills believes that such plants as that of the Ford Company, which have been offered to the country, could as readily turn out standard marine motors as marine engines are now turned out through the regular channels. He states:

"Our shipbuilding industry, in all branches, is now rushed to capacity with orders, as everybody knows, and it would seem to be just as expeditious, if not more so, to utilize some of these big plants that have been offered to the government and to begin at once the manufacture of Diesel engines, under some recognized license, for use in these ships.

"Moreover, the entire fleet will be built along standard lines, with a standard tonnage capacity for whole groups of the vessels, and this fact, it would appear, further makes practicable the manufacture of motors on a large scale for these ships.

"Of course, even if the older-fashioned steam engines are at first installed, a change can be made later. But while we are about it, why not do the job right?

"There is no question, of course, as to the superiority of the motor to the steam engine for ships up to a given tonnage, say 15,000, and none of the proposed vessels in the government-built fleet will even approach that tonnage. The oil-propelled motor is the power of the future. If the American government and shipowners here generally do not get step with progress, we will of course be hopelessly outdistanced.

"It seems to be the only thing to do. The motorship is one-third as expensive for operation as the steam-driven ship, more cargo space is possible and fewer men are required to operate the vessel."

Mr. Mills, then, by a comparison, in a vessel of the American-Hawaiian line, of the space taken up by a steam engine and boilers, and the space which the Diesel motor requires, demonstrates the saving in space in favor of the Diesel-motored ship.

In the matter of fuel Mr. Mills states:

"The cargo capacity of the vessel is 15,063 tons. There also is a fuel capacity in the double bottoms and deep tank of 3,154 tons (less 641 tons ballast), so that the maximum total fuel capacity would be 2,513 tons. As the Diesel engines (3,513 tons indicated horsepower) that would be installed would have a daily consumption of a little more than eleven tons, not more than 500 tons of fuel for their use need be carried in the double bottoms, which would give a cruising radius of about 12,600 miles, or fifty days' steaming.

"The deep tank space in the vessel, therefore, could be given over to cargo," Mr. Mills points out, "or a saving of 880 tons of cargo space. In fact, with certain kinds of compact cargo, another 1,000 tons could be taken on," he claimed.

"The fact that the Diesel motor-driven ship would use only one barrel of oil to the mile, where the steam-driven vessel would use three barrels to the mile indicates the saving in this respect."

He has figured that in normal times his company would save $134,429 in four round voyages of one vessel by converting the power from oil-fired steam engines to Diesel motors.

"There is no question as to the economy of it," continues Mr. Mills. "The fact that such well-managed companies as the Dutch Shell are adopting the Diesel motor should be enough to make our shipmen pause and investigate at least.

"There is no great obstruction in the way of either building or operating the Diesel motors. The work, in one sense, may be more intricate than the requirements of steam engine building, but it is only a question of a short time to develop the necessary expertness."

Mr. Mills does not favor having concerns here and there turn out motors on an occasional basis. This might be all right for motors for small vessels, he said, but when it came to motors for large vessels he thought the more effective way would be to have several large companies devote all their resources to a standardized type of motor, built under some license of proved excellence, such as the Werkspoor or the Burmeister & Wain.

FIRST PATROL BOAT BUILT FOR THE U. S. GOVERNMENT.

Barnes and Tibbitts, of Alameda, have built the first patrol boat to be designed exclusively for harbor patrol duty. The boat was launched on the 3rd of the month and named the "U. S. Patrol Boat Sentinel." She is now lying at the Union Gas Engine Works, where a 125 h. p. Union distillate engine is being installed. The dimensions of the "Sentinel" are 64 feet in length, 15.8 feet beam and 5 feet in depth. The hull is of wood, with a full deck-house fitted with ample quarters for two officers and five men. In the pilot house is a Binns oil-control station, directly in front of the wheel, so that, in case of an accident the engine can be controlled from the pilot house. She is equipped with a powerful searchlight and a complete electric system and will have a battery of three guns placed in position as soon as she reaches Mare Island. Her estimated speed is given as 12 knots.

EMBARGO STOPS BARLEY SHIPMENT.

One of the largest grain firms in San Francisco had chartered the Norwegian motorship "Brazil" to carry a cargo of barley to Norway, but, under the license provisions of the embargo proclamation, they were unable to obtain the necessary permit. The shipment would have aggregated about 3,800 tons of barley which Uncle Sam was not willing should reach Germany through Norway.

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The Sumner Oil Engined Motorship "Grays Harbor"

By S. E. ALLBIN.

THE launching, completion, testing out and putting into commission of the motor schooner "Grays Harbor," the second vessel constructed by the Grays Harbor Shipbuilding Co., of Aberdeen, has created practically as much interest as did the first vessel built by them, the M. S. "Santino."

The motor schooner "Grays Harbor" was originally ordered by Swayne & Hoyt of San Francisco, and purchased while under construction by the Gaston, Williams & Wigmore Steamship Corporation of New York. In size, rig, carrying capacity, machinery installation, etc., both vessels are practically identical. The dimensions are approximately 290 ft. over all, 274 ft. under the deck, 268 ft. between perpendiculars, 48 ft. extreme beam, 46′ 10″ moulded beam, 26′ 9″ moulded depth, and 24′ depth of hold. Customs House measurement credits her with a gross tonnage of 2,491 and a net tonnage of 2,017. She is particularly designed and built for lumber carrying, having a capacity of 2,250,000 ft.

She is what is known as a five mast topmast auxiliary schooner, and is of exceptionally heavy construction. An idea of her construction may be had from the following dimensions: keel, 20x24 in. in not more than four pieces; main keelsons 20x20 in.; sister keelsons 20x20 in.; rider keelsons 20x24 in.; frames 32 in.; centers 24x26 in. at keel, 18 in. at lower turn of the bilge, 16 in. at center and 10 in. at the deck; fastened with drift bolts and treenails. Planking on the flat of the bottom 5 by 16 in.; at the lower bilge 5 by 14 in., between bilges and wales, 5 by 10 in. The constructional strength is also increased by iron deck straps on top of the upper deck beams placed diagonally from the mast seatings to the outer planking. To prevent hogging she has an internal arched keelson.

There are four cargo hatches: the forward, or No. 1 hatch, being 20 by 20 ft.; No. 2 hatch, 20 by 20 ft.; No. 3 hatch, 20 by 24 ft., and No. 4 hatch, 20 by 12 ft.

The deck machinery, steam winches for handling cargo, and anchor hoists, are supplied by steam from a dry back Scotch boiler, fired with oil, and housed in a deck house just aft of the main mast. A surface condenser is installed for saving fresh water for boiler use. This deck house also contains the galley for the crew. In the forecastle head are provided the regular crew's quarters, all built to conform to American Shipping rules. On the after end of the ship on the main deck are located the officers' quarters, mess room, galley, hospital and bath.

On the poop deck are located the pilot house, engine room telegraphs, binnacle, life-boats, workboat, and other aids and necessities to navigation. A small gasoline hoist is also located here for the handling of sails.

The main engines consist of a set of 350 shaft horse power Sumner heavy oil engines, the second set constructed. Readers of Motorship will remember the complete description of these engines in the April issue, and are already familiar with them. The first set was installed in the "Santino" after having undergone extensive shop tests.

From time to time there has been received telegrams, cablegrams and other information from the "Santino" on her voyage to the Eastern coast, which has not been quite sufficient to get all of the details of operation, but sufficiently so to know that the performance of the engines has been entirely satisfactory. At a later date we hope to give a complete account of the trip of the "Santino," but for the present all that can be said is that her entire journey has been made without engine room troubles of any sort. Her average speed has been approximately 7 knots per hour; her fuel consumption less than 20 barrels per day, and her engines have operated 28 days continuously (from San Francisco to Balboa, Panama Canal Zone) without shutting down. This is believed to establish a world's record for continuous performance and proves the reliability of heavy oil engines, particularly those of the low pressure internal combustion type. It is doubtful if any true Diesel up to this time has equalled this performance.

The writer does not consider this an opportune article in which to attempt the discussion of relative values and merits of the different types of internal combustion engines, Diesels, so-called semi-Diesels, hot bulb, surface ignition, two cycle, and four cycle, but he surely does believe that the performance of the "Santino" warrants the closer attention and investigation of boat owners and operators.

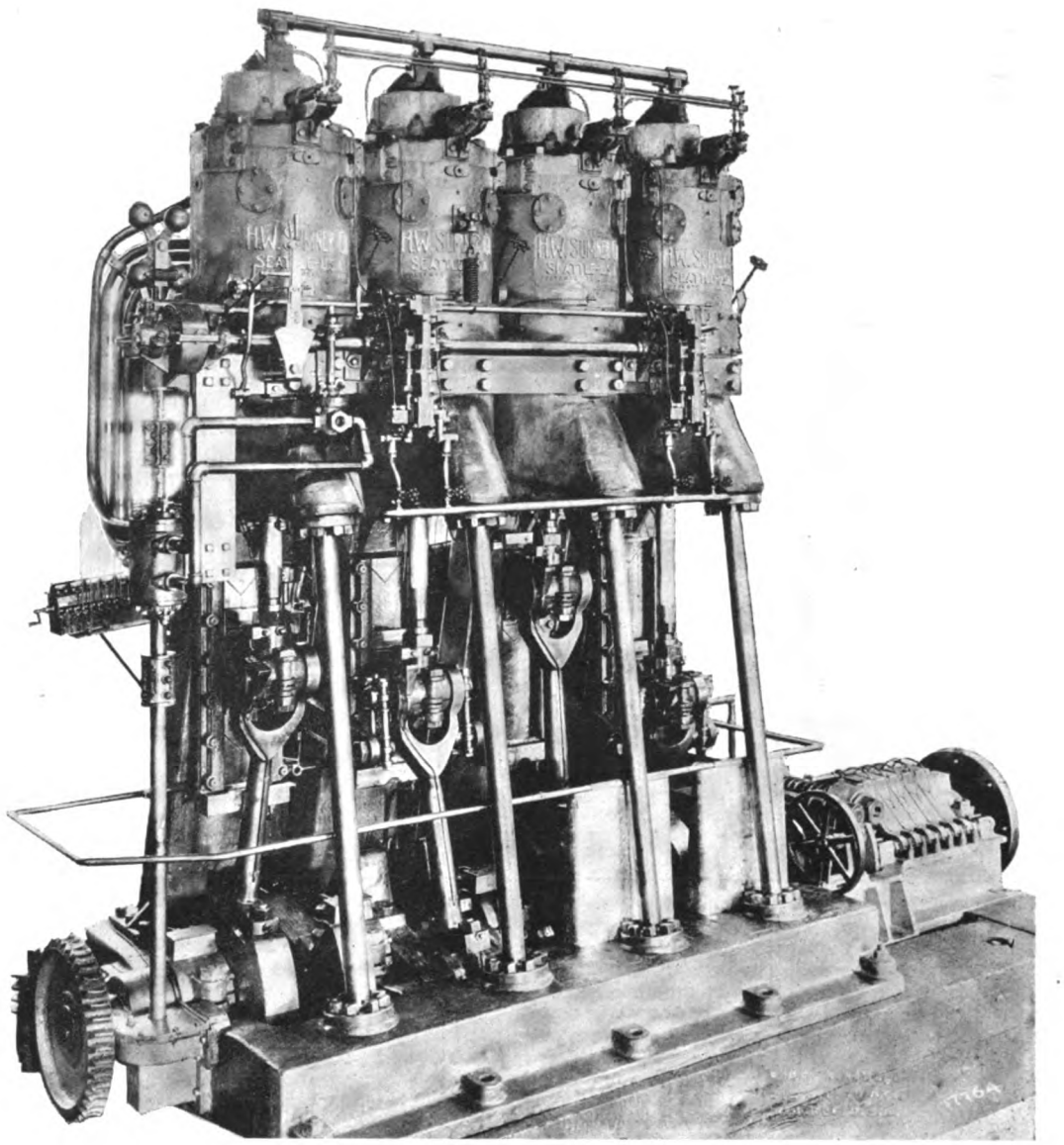
Uncertainty in choosing the type of engine to be used is often due to prejudice and the personal opinions of the purchaser, and also to the impossibility of determining fully the working expenses, especially those dealing with repair, depreciation, etc.

In certain cases, even where the conditions are particularly suitable for internal combustion engines, there are those who place all their faith in the proverbial safety of the steam engine, and prefer it to the former, perhaps even in spite of the greater first cost and running expenses.

In considering internal combustion engines of all types as a whole, it may be stated that, up to the present time, they are regarded in many quarters as being unreliable, particularly so for large ocean-going vessels, and that, while some little time ago this opinion may have been entirely justified, its retention at the present time is largely due to the fact that many engineers have not complete knowledge of this new type of prime mover, and have been unable to follow its rapid progress and to appreciate the consequent specialization.

Furthermore, peculiar as it may seem, the average vessel owner, having a boat equipped with internal combustion engines, is of the opinion that any (?) engineer will do, but he would not think of sending his steam propelled vessel to sea without the most competent engineers he can obtain. The reason for this is beyond fathoming.

The second set of Sumner engines, or those installed in the "Grays Harbor," were built by the Puget Sound Iron & Steel Works of Tacoma, and are practically the same as those installed in the "Santino." Minor refinements have been made, also simplifications which were the result of the testing of the "Santino's" engines. The engines in the "Grays Harbor" were both subjected to a shop block test before being shipped. They were run on fuel oil and demonstrated to all parties interested to show that they were in all respects up to expectations in regard to handling and operation.



ONE OF THE SUMNER ENGINES ABOARD THE M. S. "GRAYS HARBOR."

The engines were installed by the Grays Harbor Shipbuilding Co. at Aberdeen, under the direction of their chief engineer, Mr. F. S. Hogan.

A general description of the installation is warranted:

The engine room is located in the after portion of the ship under the break of the poop deck. Entrance from the deck is by two companionways, one on either side of the ship leading into what is commonly known as the fidley in steamers; this is on the main deck. In the fidley are placed the two exhaust mufflers, one for each main engine. Between them is the companionway leading to the grating in the engine room. The engine room hatch extends to the upper deck and is covered by skylights and ventilators which provide an abundance of light. Upon entering the fidley and looking down into the engine room a person is somewhat surprised by the small amount of space and the simplicity of the engine room for a vessel of this size. Although the engine room hatch is small, being approximately 18 ft. wide by 18 ft. long, there is an abundance of room between and around the engines. At the forward

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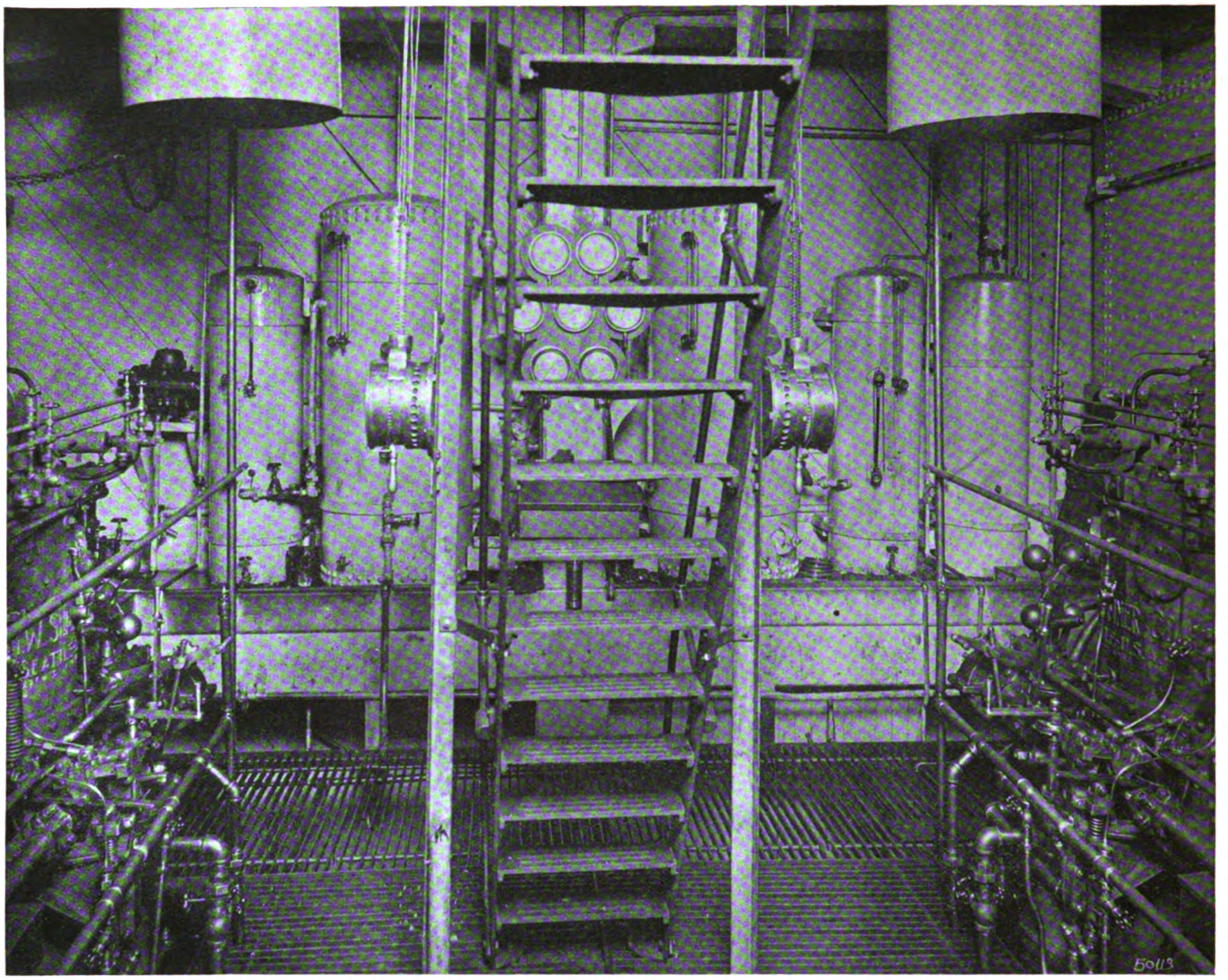

ENGINE ROOM OF THE M. S. "GRAYS HARBOR," SHOWING SUMNER OIL ENGINE

end of the hatch on the between deck is a shelf about 4 ft. wide upon which are placed the day tanks, burner tanks, filters, meter and fuel pump with their respective gauge glasses and controls. All handling of the fuel oil from any one of the main fuel tanks (there being six of them) is done from the grating. Piping arrangements are so that the fuel oil may be transferred from one tank into another for purposes of trimming ship. At the forward end is located a gauge board upon which are mounted the necessary gauges used in the operation of the engines. The engines are installed so that the controls are inboard, and in case of necessity one engineer may handle both engines. Telegraphs for each engine are located conveniently and can be handled by the man standing at the throttle of the engines.

On each side of the engine room, on the between deck, are placed fuel tanks, and aft of these to the after end of the ship are additional fuel tanks. The total capacity is approximately 1,600 barrels, or sufficient to give her more than 80 days at her best speed when handled by the main engines only.

At the after end of the engine room grating is a companionway leading down which lands a person on the floor plates between the main engines. It is here more than anywhere else that the refinements of these engines and the facilities and accessibility for continuously knowing what the engines are doing are visible. Both engines are identical in all respects with the exception that one is right hand and the other is left hand. They handle inboard turning screws of 6′ 6″ diameter and 4′ 6″ pitch, three bladed, cast iron. Reference to a photograph of one of the main engines with this article will show all that can be told in a lengthy descriptive article and is very much more interesting.

At the forward end of the engine room on the port side placed athwartship is a 20 h. p. 2 cylinder Remington heavy oil engine direct connected on one end to a triplex geared bilge and fire pump. On the opposite end is an Ingersoll-Rand air compressor, which is used as an auxiliary for starting purposes. Both the bilge and fire pump and air compressor are driven through clutches. On the outboard side of the port engine is mounted a steam fire pump which can also be operated by air and used for bilge service. Outboard of the starboard engine, at the forward end, is installed a single cylinder Remington heavy oil engine direct connected to a 5 K. W. generator which furnishes lights.

Aft of the main engines and installed in a manner to occupy the least space are two air tanks approximately 4 ft. in diameter and 10 ft. long for storing the air used for starting and reversing purposes. This pressure is ordinarily carried at 180 lbs. per square inch, but it is only necessary to maintain 50 or 60 lbs. in order to handle the engines. As a rule one half a revolution of the crank shaft of the main engines is all that is required to give them fuel oil and continue on the same. Each cylinder is equipped with an automatic stop valve so that as soon as an explosion takes place therein it automatically cuts off the air being fed to the cylinders for handling purposes which means an economy of air consumption. In the extreme after end of the engine room below the between decks are installed two lubricating oil tanks, one for cylinder oil and one for oil for the bearings. Well placed and ample lockers are provided for storing engine room stores and materials such as are always required on ocean-going vessels; also a convenient work bench and tool rack with all the necessary wrenches, etc., is provided.

On July 7, both main engines were turned over at the dock for a period of one and one-half hours to see what discrepancies existed anywhere in the installation before taking the vessel out on the trial trip. This dock trial was of very short duration because it was found that the installation all the way through was practically absolutely satisfactory. Minor changes were made, the change of greatest importance being a change in the tips of the injection nozzles of the main engines. At the shop these engines were tested on 23° gravity Beaume oil and the fuel used on the vessel being 27 plus did not produce as good combustion as with the original tips used. After being assured that everything was satisfactory, the vessel was placed in readiness for a trial trip, which was run the following day on Grays Harbor.

Insurance on the vessel did not permit taking her over the bar, and it had to be confined to very narrow tortuous channels, and with a strong wind blowing, made it exceedingly hard to navigate, particularly so with a light vessel. The vessel, while on her trial trip, was in charge of Capt. Geo. Sanborn of Hoquiam; the engine room was in charge of S. E. Allbin, in view of Mr. Sumner's absence in the East. The engineers on watch and handling the engines were those that constitute the ship's crew, Mr. Geo. A. Johnston being chief engineer and supervisor for Gaston, Williams & Wigmore, owners of the vessel, Mr. F. S. Hogan representing the Grays Harbor Shipbuilding Co. All engineers on board and all other visitors who have been on trial trips expressed themselves as being of the opinion that it was the best and most successful trial trip they had ever taken. The machinery was in splendid working condition and the vessel responded to all signals in the very best manner.

The speed made was 8½ knots per hour, which is considerably above the guarantee called for. The first two hours of the trip were at an average of 160 r. p. m. on both engines so as to give the engineers an opportunity to familiarize themselves with the engines. In response to a request for more speed, if it was there, they were opened up to 230 r. p. m. The engines are rated to develop their full power at 210 r. p. m.

Among those on board of the vessel were Mr. Albert Schubach, president of the Grays Harbor Shipbuilding Co.; Mr. M. R. Ward, manager and in direct charge of construction for them; Capt. Green, Gaston, Williams & Wigmore's representative, and who will take the ship upon her first

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trip, Mr. Kenneth Walker, representing Bureau Veritas, was also present.

The main points of difference in the "Grays Harbor" engines and the "Santino" engines exist merely in small details. The fuel injection pumps have been revised, simplified and possibly made a trifle more positive in their action. A different type of fuel nozzle is also used which is considerably simpler than that with which the "Santino" was originally equipped. The force feed lubricators are also provided with more leads, allowing the mechanical lubrication of more parts and subjecting the oilers to less work. The piping on the engines for water circulation is also somewhat simplified. These practically constitute all the changes from the "Santino" engines which have proved so satisfactory.

At the present time it is not known for which port the "Grays Harbor" will load, but it is expected that she will carry a full cargo of lumber to the West Coast.

BUILDING FOR WEST COAST TRADE.

W. R. Grace & Co. are having four auxiliary schooners built on Gray's Harbor. Two of them, the "Santa Isabel" and the "Santa Elena," are ready for the installation of their engines in the yards of the Matthews Shipbuilding Co., and the other two are in about the same stage of construction at the Aberdeen Shipyard. The "Santa Isabel" and the "Santa Elena" are twin vessels 225 feet long with a breadth of 42.6 feet and a depth of 28.6 feet. They are engined with two 320 h. p. Diesel engines of the usual type. At the Aberdeen Shipyard the "Santa Christinia" and her sister ship, as yet unnamed, are in different stages of development. They have a length of 235 feet, a beam of 43 feet and a depth of 24 feet. As in the case of the others they will be provided with two 320 h. p. Diesel engines supplied through the agency of Henry Lund & Co. They are destined for the West Coast trade, to supply the deficiency in bottoms that has hampered W. R. Grace & Co. in the operations of the company's export and import trade with Central and South America.

GREAT RACER AS MOTOR ENGINE AGENT.

The Wisconsin Motor Mfg. Co. of Milwaukee is represented in San Francisco by the Earl P. Cooper Co. Earl P. Cooper, it may be recalled, is one of the kings of the automobile speedways of the country. Only recently he won the Chicago Sweepstakes in a 250-mile contest. In all his races he has used the Wisconsin Motor Mfg. Co.'s engines, and his close connection with the company, no doubt, procured him the agency of the company's motors for the Pacific Coast. The agency has two stores, one in San Francisco and the other in Los Angeles. In San Francisco the agency is installing a medium duty 70 h. p. motor, with a 5¾ bore and a 7-inch stroke in a launch being built for the Government at the Kneass yards. The launch is 45 feet long by 10 feet beam and is intended for use at Fort Kamehameha, Hawaiian Islands.

LAUNCHING OF THE MOTORSHIP "RISOR."

The motorship "Risor," built by the Washington Shipping Corporation of Seattle for the Alexander Prebinsen Company of Risor, Norway, was launched on July 7. She is the fourth ship to be launched from this plant, and five more keels are now on the ways, three of which are well on the way to completion. Mrs. E. Markussen, wife of the master of the motorship "Portland," built at the same plant, was the sponsor.

The "Risor" is a four-masted barkentine-rigged vessel, equipped with twin 250 b. h. p. Mietz & Weiss oil engines, capable of developing a speed of 10 knots per hour. She is of the same type as the "Tacoma," "Portland" and "Remittent." All of these vessels are listed and rated by the Bureau Veritas. She is 252 feet o. a., 44 feet beam, and a depth of hold of 21 feet. Her loaded capacity is 2,500 tons.

The Washington Shipping Corporation has a contract to build ten vessels of this type for the French Government and has already laid keels for two of them. On the ways vacated by the "Risor" a third keel will immediately be laid.

WANTED—A MOTOR.

An American schooner recently took 26 days making a voyage from Tynemouth Creek, Nova Scotia, to Weymouth, U. S. A. Adverse winds and fogs compelled her to seek shelter in several harbors. Evidently an auxiliary motor is badly needed.

The Recognized Authority

Where facts about the Fishing Industry are in question, be it anywhere the world over, the *Pacific Fisherman* is consulted.

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PACIFIC FISHERMAN

SMITH BUILDING, SEATTLE, U. S. A.

THE M. S. "BRAMELL POINT."

We are enabled to report on the authority of the owners that the motorship "Bramell Point" has proved,—after eight months' operation,—a distinct success. Full details of her working will appear in the September issue of Motorship, through the courtesy of her owners, the Vacuum Oil Co. We can state in advance that her performances will be a revelation to those steamship owners who doubt the reliability of motorships. This is another of the vessels about which scandalous, but unfounded, rumors constantly have been passing through shipping circles, and we are glad to be afforded the opportunity of proving in black-and-white their utter fallacy.

BUILDING MANY MOTOR BOATS.

A number of small craft for commercial use are under construction at the Kneass yards. Among them may be noticed the seven 20-foot boats for the Union Iron Works. Each is to be powered by the Union Gas Engine Co. with a 4 h. p. motor, and they are intended for use as tenders at the company's two yards on San Francisco Bay.

PRICES OF SHIPS.

Prices for ships now range up to $250.00 per ton d. w. c. It is interesting to record that the first ship to sell for over $100.00 per ton was the "Kangaroo" ex "Lalandia," a Diesel-driven motorship. She was bought by the Western Australia Government in 1915 for $101.00 per ton d. w. c. She is a vessel of 6,700 tons d. w. c.

STEAM TO DISTILLATE.

The old tug "Tacoma" has been purchased by John Riplinger of Seattle, Wash., who has had a 150 h. p. distillate motor installed.

SKANDIA SALES.

The Skandia Pacific Oil Engine Company announces the following sales: Four 350 h. p. to the Washington Shipping Corporation of Seattle; two 240 h. p. engines and auxiliaries to the Sandstrom Shipbuilding Company, also of Seattle; two 140 h. p. four-cylinder to East Coast interests.

The installation of the two 240 h. p. Skandias in the No. 5 schooner hull at the yards of the Washington Shipping Corporation is practically completed. The Peterson Shipbuilding Company of Aberdeen, Wash., has building two vessels in which Skandia installations will be made. One of these vessels is being built for foreign interests and will be equipped with twin engines of 385 h. p. each. This type of engine was specified in the order to the builder, from Europe. The other set of engines will be of 240 h. p. The motors of the "H. C. Hansen" are also being installed at Tacoma.

SHIPBUILDERS SELL OUT.

The three brothers Moore have bought out the Scott interests in the Moore & Scott Iron Works, owning the recently enlarged shipyard on Oakland Harbor. By the terms of the deal Henry T. Scott and his two nephews, John T. and Irving M. Scott, Jr., have transferred to the Moore brothers their stock in the company or the consideration of $135,000, and have retired from the company altogether. What the reasons were for the retirement of the Scotts at this particular period, when the yards were crowded with contract work of a large character and big profits seemed to be a certainty, are not exactly known. The company has ten ships in various stages of development in its yards—four of the ships having been ordered by the Cunard Steamship Co. and about 2,200 men are employed in the yards.

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MOTORSHIP

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EXISTING SAILING SHIPS.

THERE are under construction and already engaged in the coastwise and foreign trades a very large number of American-owned sailing ships of from 100 to 2,500 tons dead-weight-capacity. Without doubt or hesitation the U. S. Shipping Board, or the Shipping Board Emergency Fleet Corporation, should order the owners of such vessels to install auxiliary oil-engines, for propelling purposes at such times when the ship is sailing against adverse winds, adverse tides, during calms and in-and-out harbors. Thus would the annual carrying capacity of these ships be at least doubled, despite a certain amount of cargo space that necessarily would be occupied by the motor and fuel tanks.

Furthermore, a large number of tug-boats would be released for other urgent duties, also this action would help to relieve the railroad congestion because of the large number of coastwise vessels involved, particularly along the Atlantic Coast.

Such authority should immediately be granted someone by the Government, meanwhile a threat to commandeer these sailing-vessels should be sufficient to cause instant action on the part of the owners. We are at war, and war is war, and this is no time for humbugging and palavering, so let stern measures be taken if necessary.

The actual work of conversion would require from one to six weeks, according to the size of the vessels and the powers to be installed; but in many cases some of the structural alterations can be carried out while the ships are in service prior to the installation of the motors. The powers required will vary from 50 h. p. to 1,000 h. p. in single and twin screws. Most of the engines, however, will be under 100 h. p., and such can fairly quickly be obtained in sufficient numbers.

BRITAIN AND WOODEN SHIPS.

The daily-press, with its usual poor judgment shown when dealing with marine or technical subjects, is "shrieking over the housetops" because Great Britain is having numbers of steel ships built in the United States and in the British Isles,—but no wooden ships, whilst America builds wooden vessels. It hardly is right to blame Great Britain for this state of affairs. In the first place the amount of suitable timber in that country is almost negligible, and to import lumber would be using ships needed for other valuable cargo. This the daily-press apparently prefers to ignore, also that Canada is subsidizing wooden motorships.

Secondly, representatives of the British Government and of the Cunard Line came to this country and find that steel shipyards can and are willing to give reasonable orders for steel-built freighters, simply because the erratic and impeding actions at Washington have the effect of putting American shipowners into such a state of nervousness that many are absolutely afraid to order new ships at the existing high prices. Had the Government not hampered domestic shipowning through foolish legislation and unsettled shipping policies the American shipyards would have been so choc-a-bloc with domestic orders for steel ships that it would have been almost impossible for British or Norwegians to have placed any orders here at all and they would perforce have had to be satisfied with wooden ships. Thus would America have had a proper mercantile marine. The muddle, hesitation, and ignorance still continues at Washington, meanwhile the private mercantile marine suffers. Government ownership is the next nail in the coffin of the privately-owned mercantile marine, as the freight-rates promised will not pay the war insurance on some of the vessels owned by American shipping companies.

THE NECESSITY FOR DIESEL-POWERED SHIPS.

In a recent issue of "The Evening Mail" of New York appears an editorial under the caption, "Oh, for a Great Captain!" This article is of timely interest to American shipowners and builders. We print an excerpt from it verbatim:

"Wise men plan, then act.

"The carrying trade of the world is disorganized. The world needs ships as never before. It needs ships not only for immediate requirements, but ships adapted for the best service under the revolutionary changes that are coming in sea traffic.

"Europe is alert. America is not.

"Europe is planning, acting; America talks.

"Foreign companies have placed orders for six years ahead for motor-driven vessels. They know the age of coal is passing, that the age of oil is coming. America will be under a serious handicap if it is not able to meet with such competition."

GERMANY AND TANKERS.

Since writing our article on Germany's attempt to exterminate the world's oil-carrying fleet, Rear-Admiral Bradley A. Fiske has stated that "the oil supply of the British fleet is so seriously menaced that the use of her newest vessels is threatened." Confirmation of our remarks from such a high authority emphasizes the importance of Motorship's recommendation to instantly build a fleet of Diesel-driven tankers.

When the tank motorship "Sebastian" recently caught fire it was, of course, due to her Diesel machinery—at least some malicious people so suggested to the U. S. authorities; but when this was followed in a month by the tank steamship "Santuroe" catching fire en route from Tampico to New York it was hailed by the daily press as a German plot. Oh, no! the "Sebastian" could not have been a German plot because she was Diesel-driven!

DRAWINGS FOR REPRODUCTION IN MOTORSHIP.

All American technical journals have great difficulty in securing from naval architects, engine and ship builders, proper drawings for reproduction purposes, most concerns persisting in sending "blue-prints." Now, blue prints will not reproduce—that is to say, cuts for printing cannot be made from them except by an expensive wax negative process.

Few manufacturing companies seem to be aware that there is a well-known black print process in which a prepared sensitized paper is used much the same as in blue prints. However, an inexpensive method of reproducing tracings and giving black lines on ordinary white paper is used by the National Process Co. of 117 East 24th Street, New York City. This method is a photographic process of plate making, after which the reproductions are made, on any ordinary bond or other paper by a printing press. It is the latter process which cheapens the cost in large quantities so materially, as the average brown or black print on prepared paper can be produced but one print at a time, taking many minutes per exposure. This process on the other hand produces many copies per second.

An incidental advantage of this process is that alterations and changes can be made in the plate with great facility, so that having had some prints run off, the changes can be made and more prints run off, with little extra expense and no trouble. If it is desired to make a particularly durable print for shop and field use, the black line prints can be mounted on cloth or actually printed on cloth. When builders are arranging to send drawings to Motorship for reproduction purposes we shall appreciate their sending prints having black lines on a white background.

THE NEED FOR TRUTH.

Prejudices have been created in the United States against the marine Diesel-type engine primarily by failures of certain engines made in this country and abroad; but also by the lack of discussion of these failures. If reason clearly be shown for the failures of certain designs of any special class of machinery, then it is possible to gain appreciation for the success of other designs of that same class of machinery, whereas if the said failures are allowed to remain as undisturbed recollections in the minds of engineers and shipowners, then one must expect that the whole class of machinery will be branded as unfit.

M. S. "SANTINO" REACHES BOSTON AFTER RECORD VOYAGE.

No vessel leaving any port on the Pacific Coast has been followed with so much interest by shipowners, engine makers and, in fact, every one who is interested in shipping of any description, as the auxiliary schooner "Santino." This interest is due to the fact on board her were installed the first set of Sumner heavy-oil engines built.

The "Santino," after loading 2,200,000 feet of lumber on the Columbia River, left Astoria on the sixth of May. She called at San Francisco, where, after staying a few days, she left on May 24 for Balboa in the Canal Zone. On June 20th she arrived at this port, having completed a continuous run of 28 days with absolutely no engine trouble. Her average fuel consumption for this leg of the voyage was 15.33 barrels per day. She left Colon June 27th and arrived in Boston on July 14th, taking sixteen days and sixteen hours to arrive at that port. Her average fuel consumption for this part of the voyage was 15.12 barrels per day. On her west coast portion of the trip she consumed 424.2 barrels, on the east coast portion she used up 198.2 barrels, making her total consumption amount to 622.4 barrels. She averaged 5.5 knots on the west coast and 6.1 knots on the east coast. This time is exceptionally good.

In the reports received from Mr. H. W. Sumner it was stated that at the end of the voyage all the bearings were cool. No cylinder trouble was evidenced on the whole voyage. A great amount of oil was used on the bearings which could have been saved if the engines had been equipped with proper saving devices and splash guards. In these advices it was stated that the cylinder consumption was only normal. Several other minor defects were noticed, among these it was found that the auxiliary engines were not suited for salt water, for the reason that the nozzles plug with salt. Notwithstanding these few minor defects the performance of the "Santino" and her engines was entirely satisfactory to both the owners and designer. The engine has proven itself a hardy and serviceable seagoing motor and the owners and designer are to be complimented.

MOTORSHIP NOTES.

The French Government has purchased three 2,600-ton auxiliary wooden sailing-vessels.

Now under construction at Norwegian shipyards are four motorships, representing a total of 4,420 tons.

No less than $32,000,000.00 is to be loaned to shipowners by the French Government towards the cost of construction of mechanical-propelled cargo vessels.

The motor auxiliary "Magrudada," a new vessel of 1,288 tons, which is being equipped with two 320 b. h. p. surface-ignition oil engines, has been sold to Brazilian interests.

From the Dominion Government of Canada the Lamonde & Harrison yard of Vancouver has received an order for a motor auxiliary schooner 255 ft. long o. a., 225 ft. length on keel, 44 ft. moulded breadth, and 21 ft. 4 in. moulded depth.

Doxfords of Sunderland, and Harland & Wolff of Belfast have, despite the war, carried out a considerable amount of experimental and actual commercial construction of marine Diesel engines, as also have Swan, Hunter & Wigham Richardson of Wallsend-on-Tyne.

Some shipowners are resorting to steam purely because of the lengthy deliveries offered by some oil-engine builders. Incidentally we note that the S. S. "Johanna Smith" is being towed up and down the Pacific Coast, awaiting her two 750 i. h. p. De Laval steam turbines, which will not be installed until September.

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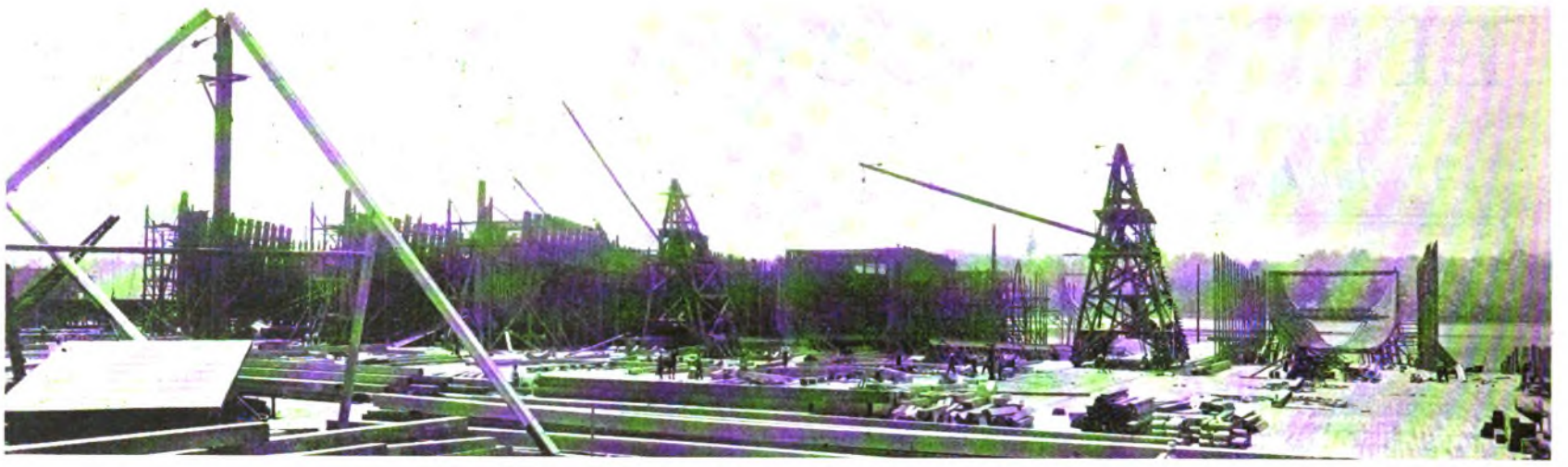


SLOAN SHIPYARDS, SHOWING VESSELS IN DIFFERENT STAGES OF CONSTRUCTION.

The Sloan Shipyards Corporation

THE Sloan Shipyards Corporation of Seattle is one of the largest and most successful builders of wooden ships in the country. This success can be directly attributed to the efficient organization of the corporation's head, Mr. Philip D. Sloan, coupled with the previous successes in wooden shipbuilding carried on by Mr. Sloan and Mr. Jos. A. Sloan, who is now acting as adviser to the corporation. These men have been builders of wooden ships for a great number of years, both on the Great Lakes, where they were successful, and on Puget Sound.

Their present yard is the natural outcome of the amount and success of their endeavors. Until a short time ago the yards were located in Seattle, the name of the company then being the Seattle Drydock Company. With the war and the subsequent demand for ships, and especially wooden ships, the need for more space was immediately foreseen by the company, who began to lay plans for the development that was imminent. A company was incorporated under the laws of the State of Washington with a capitalization of $1,000,000, with $400,000 in preferred shares and the balance in common stock.

Mr. Philip D. Sloan, who owns two-thirds of the stock, was chosen president and general manager; H. H. Piper, first vice-president; Leroy Richards of New York, second vice-president; John O. Pierce, secretary and treasurer. The main office is stationed in the Colman Building, Seattle. Mr. Jos. A. Sloan, as adviser to the corporation, has his office in the same suite.

They secured a lease on five city blocks in Olympia, the capital of the State of Washington. The yard at Olympia is built at the extreme end of Puget Sound and is directly over the water, being constructed upon piling (9,000 piles were driven). These piles were decked with three and four-inch planking, which adds to the efficiency of the yard by eliminating dirt, etc., and aids the handling of heavy timbers. In Seattle their plant was located on the East Waterway until it was abandoned a few years ago.

Immediately after securing the lease and the erection of the necessary buildings, etc., the construction of eight full-powered ocean-going motorships was commenced. At the present time there are six vessels on the ways, and the corporation are now adding two new berths, which will be completed within the next ten days, at which time two more keels will be laid, making eight ships under construction at the same time.

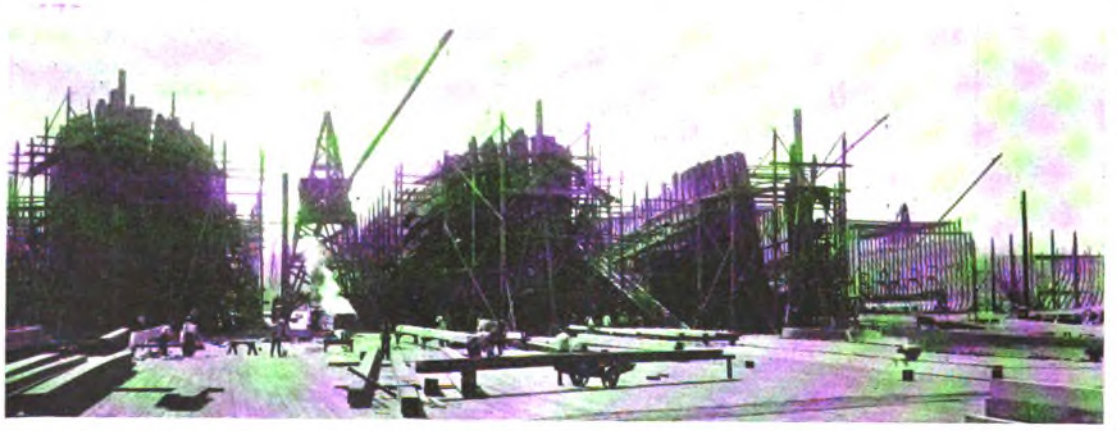
The type of vessel being constructed by the company is a full-powered motorship, having a length of 280 feet over all, a beam of 46 feet and a moulded depth of 24 feet. They will be of 3,200 tons dead weight. Each vessel will be equipped with two 500 b. h. p. 6-cylinder 4-cycle McIntosh & Seymour Diesel type oil engines, giving a total of 1,300 i. h. p. to the hull. By the terms of the contract with the engine company a set every month or two weeks will arrive at the yards. Thus no ship will be held up on account of slow delivery of the engines. The auxiliary equipment will be steam driven. The ships built by the company are all built for owners' account. Twelve large ships can be built in a year. The company has signed contracts for twenty (20) vessels, and will in the near future start the construction of a vessel for their own use, which will be an exact duplication of the boats now building. She will be equipped with engines of the same make and power as her sister ships.

PHILIP D. SLOAN, PRESIDENT AND GENERAL MANAGER.

The most modern devices for handling heavy pieces are installed. The ships are built in pairs. In the space between the two boats a track is laid upon which a huge gantry crane is mounted serving the two ships. In the yard a locomotive crane is mounted on tracks distributing and unloading lumber all over the yard. Two stiff-leg cranes, one with a 100-foot boom and one with a boom af 70 feet, are installed for distributing heavy material to and from the heavy machines. A 60-ton shear leg is now being installed to place the engines in the boats. Every piece of equipment installed is the very last word along the line of handling heavy materials.

The Capitol City Iron Works (now a part of the corporation), the new machine shops and the plant proper represent an investment of $350,000, and according to the statements of the owners makes this plant the most modern and best equipped plant of its kind in the world. The new machine shop is 135 feet long and 40 feet wide and is two stories high. A 1,500-pound steam hammer and a two-ton electric furnace are two of the latest installations to be made.

A force of 300 men are employed, most of whom are the best available in their line of work. They are increasing this force daily and by the end of September 500 to 600 men will be employed in the yard and the machine shop. The working conditions are ideal, there being no dust. All heavy material is handled automatically, which makes it the most pleasant place for labor that could possibly be conceived.



NEAR VIEW OF SHIPS ON THE WAYS.

FIAT DIESEL ENGINES.

We are informed that the F. I. A. T. Company of Turin have abandoned the stepped-piston design with their latest engines. The two 1,300 b. h. p. Fiat submarine Diesel engines, illustrated and described in Motorship for April, originally ordered by the German Admiralty, were not shipped, but now are propelling a 1,000-ton Italian submarine which has a speed on the surface of 18 knots, so is equal in power and size to the 1916 class of German U-boats.

THIRTEEN STEEL-BUILT MOTOR AUXILIARIES.

At the end of the past year the Marstal Shipyard at Avo, Denmark, had under construction, or on order, seven motor-driven auxiliary vessels of 700 tons d. w. c, and six of 250 tons d. w. c. Only steel ships are built.

STANDARDIZED MOTORSHIPS

The Ring Andersens Shipyards and the Holeby Diesel Works are jointly building Diesel-driven auxiliaries of 600 tons d. w. c., fitted with engines of 160 b. h. p. Both the hull and machinery have been standardized.

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A PLAN FOR CONCRETE MOTORSHIPS.

A BOSTON expert in construction engineering has written the "Boston Evening Record" in which he has put forth the claims of the concrete motorship as a means of eliminating the loss in the matter of cargo ships during the submarine campaign carried on by Germany. He states:

"My plan makes little if any change in the outward appearance of our modern steel ship, except that the structural part of the ship is of a specially prepared emulsified concrete reinforced with a fabricated network of steel rods that bonds the ship together in every part, giving great strength and making the structure one continuous monolith. All decks, bulkheads, partitions, etc., are interwoven together in one continuous mass of steel and concrete. The ship has two hulls and a double bottom; the double hull runs to above the water line all around the ship. There is a space of 3 ft.-0 in. between the outer and inner hull, which is divided every 12 ft., making a continuous number of water-tight compartments 3 ft.-0 in. x 12 ft.-0 in. girding every part of the ship to above the water line. In the center of this 3 ft.-0 in. space is a system of fabricated steel rods looking somewhat like a heavy wire fence; the purpose of which will be explained later. This space between the double hulls and double bottom is not wasted, but being watertight, is used as storage tanks for carrying oil cargoes and for storing fuel for the ship's engines, the vessel being driven by oil engines, requiring a much smaller crew than a steam-driven vessel and giving more space for freight.

"The designs and methods of fabricating the steel reinforcing rods is such as to make a ship strong enough to resist the heaviest sort of a gale without straining herself, yet no attempt is made in this plan to build the outer hull heavy enough to resist the explosion of a torpedo; so let us suppose such a ship is struck by a torpedo fired from an enemy submarine; the force of the explosion is so great that a hole two or three feet in diameter may be shattered in the outer hull, and now appears the use for the fabricated rods (or strong wire fence) inside the space between the two hulls.

Torpedo Made Harmless.

"These rods work on the same principle as Mr. Maxim's gun silencer, they dissipate, or in other words, break up, the force of the explosion, at the same time they protect the walls of the inner hull from being damaged by flying pieces of the concrete; thus a section 3x12 feet is damaged and its cargo of oil is thrown against the force of the explosion, but this of itself helps to cool the hot gases caused by the explosion; each 3x12-foot section is vented at the upper deck with a hatch that opens outward to let the explosive gases escape. The torpedo has now done its worst, and the ship has lost a few hundred gallons, maybe, of fuel oil, but the damage can readily be repaired in a few hours on arrival at her destination, or even while at sea if necessary, as concrete will set in water without decreasing its strength.

"It will also be seen that if a vessel of this kind should be damaged by collision or by striking a rock or an iceberg, only her outer hull could be damaged, while her freight and passengers are carried to their destination in safety. A few of the items to recommend such a vessel are:

"First. A stronger and more durable sea-going vessel at less cost.

"Second. Can be built in one-half the time required for a wood or steel vessel.

"Third. An absolutely fire-proof structure.

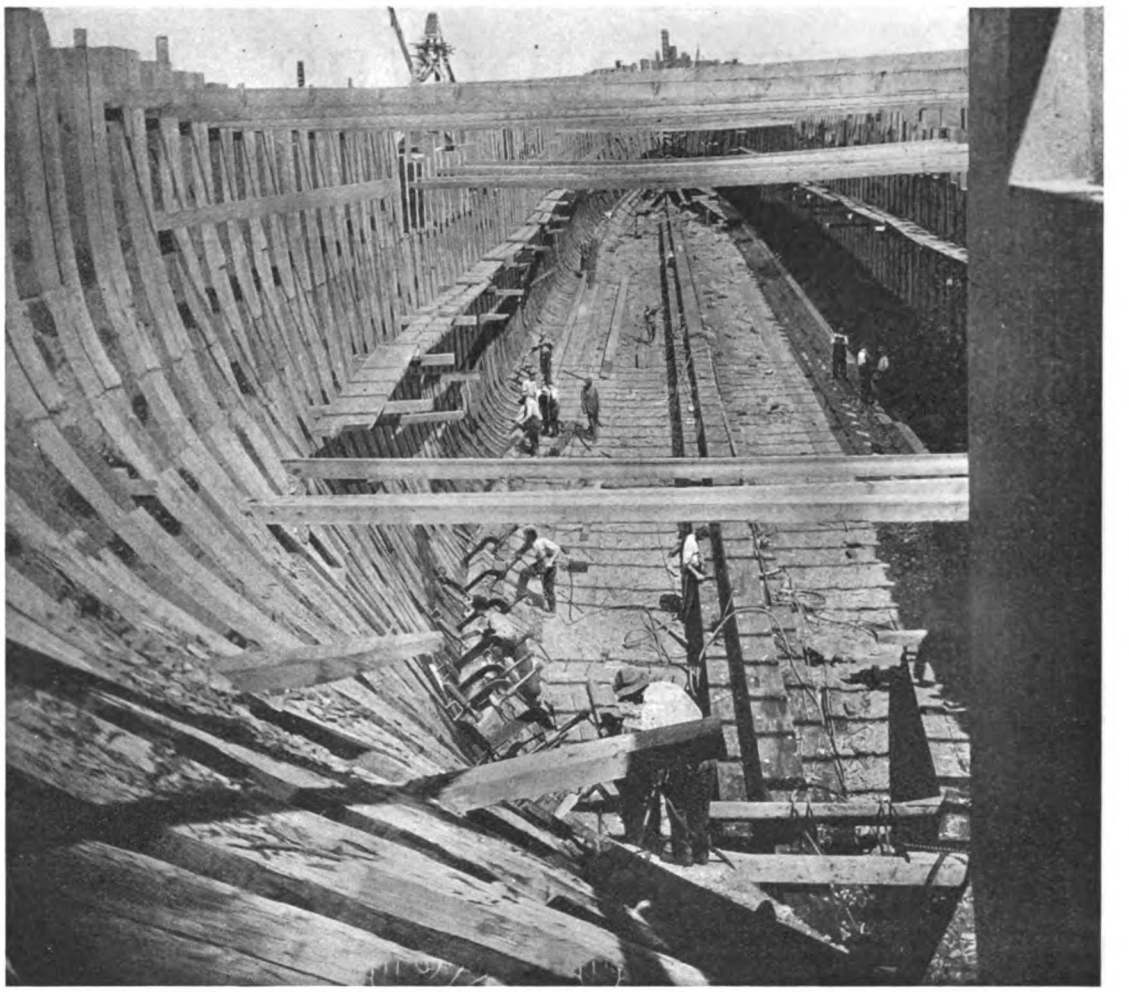
"Fourth. A vessel practically free from vibration, greatly adding to life of machinery and comfort of passengers.

"Fifth. A saving in up-keep; the hull, all outside and exposed surfaces can be of white cement, effecting a large saving in painting, etc.

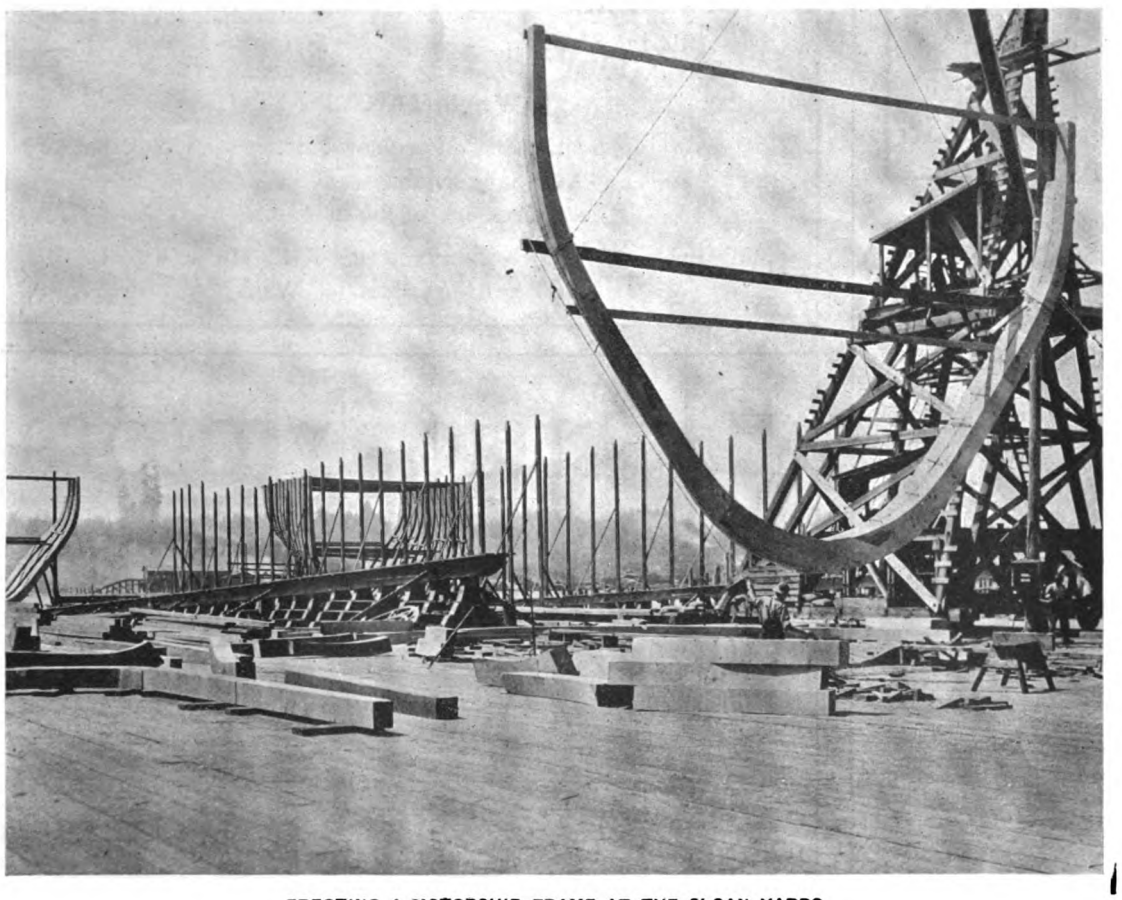
"Sixth. The attainment of graceful lines and good design at no added cost, owing to the flexibility of the material while in its plastic state.

"Seventh. A powerfully strong hull with an outer surface as even and smooth as glass and proof against barnacles and corrosion.

"Eighth. The arrangement of a series of watertight compartments that will make the vessel practically unsinkable."



INTERIOR OF SHIP UNDER CONSTRUCTION AT THE SLOAN SHIPYARDS.



ERECTING A MOTORSHIP FRAME AT THE SLOAN YARDS.

NEW GAS ENGINE COMPANY IN THE FIELD.

While the Acme Engine Works of San Francisco was started tentatively several months ago, it is only recently that organization has been actually perfected. The company is now incorporated. The president is James S. Hawkins, formerly manager of the Standard Gas Engine Co. C. C. Kriemler, the chief organizer of the new company, and formerly sales-manager of the Standard Gas Engine Co., is vice-president. Richard Froboesi, at one time chief engineer of the Corliss Gas Engine Co. and later occupying the same position with the Standard Gas Engine Co., is now chief engineer of the new company. Joseph O'Donnell, the foreman of the machinery department, was for 16 years in the employ of the Standard Company, and George Bonds, foreman of the assembling department, held that position under the old company for 14 years. The Acme Engine Works is a closed corporation and its stockholders consider that it has as good an organization of practical, capable men in their line of work as there is on the Coast.

MOTORSHIP LINE BETWEEN PHILADELPHIA AND PROVIDENCE, R. I.

There is a project under way to establish a motorship line between the ports of Philadelphia, Pa., and Providence, R. I., the terminal of which will be at the Municipal Pier at Chestnut Street, Philadelphia. The vessels will be about 150 ft. long, of 500 tons d. w. c., and will be propelled by Diesel oil engines.

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Takes Issue With Morton's Statements

Motorship is in receipt of a communication from Thos. Orchard Lisle in which he takes issue with Mr. Morton in regard to several statements made by Mr. Morton in his article in July's number of Motorship. We are printing the letter in full:

Editor Motorship.

Dear Sir:

Regarding Mr. John W. Morton's article in your June issue, page 12, he compares the consumption of the S. S. "Saltburn" with the old Diesel ship "Eavestone," and then states that "the figures given show that one ton of oil cannot do the same amount of work of four tons of coal under practical working conditions."

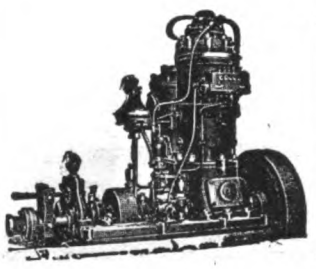
This is a distinctly unfair and misleading comparison, because the "Eavestone" had a two-cycle motor of unsuccessful design, and it is accepted that the consumptions of two-cycle engines are about 18 per cent higher than four-cycle Diesel motors. Furthermore, the M. S. "Eavestone" carried more cargo than did the S. S. "Saltburn." Hence, the amount of fuel per ton mile of actual cargo carried is the only fair comparison. Thus it will be found that the amount of oil needed to drive a certain quantity of cargo is about one-fifth that of coal. The actual h. p. consumptions, without considering the cargo factor, are 0.3 lbs. per i. h. p. hour, as against 1.3 lbs. per i. h. p. hour, respectively, including auxiliaries. Saving of fuel in port also must be added because all coal burned has to be paid for by the shipowner whether the ship is in dock or at sea. Consequently the only really true comparison is the total amount of coal per ton of cargo carried in one year, compared with the total amount of oil used in the same period. If exhaust-gases are properly utilized this will show even better results than what I have just quoted.

Furthermore, Mr. Morton states that "it is still cracked cylinder heads and jackets which keeps owners and designers busy." As in answer to this I desire to assert that Werkspoor of Amsterdam have not had a single cylinder crack, cylinder-head crank, or jacket crack, with any marine Diesel engines built during the last two years, and I believe that Burmeister & Wain of Copenhagen can make a very similar claim. It is a shame that Mr. Morton should decry the Diesel engine by putting such unauthorized statements in black and white—statements that he cannot prove, or reasonably claim accuracy for.

Consequently, it is to be hoped that little reliance will be placed in Mr. Morton's article by shipowners seeking reliable information, particularly as two of the Diesel ships quoted by him are old-timers, built under conditions that promised failure before they were launched. In fact, one of them eventually had her motor removed and replaced by steam, after which she was sunk by a submarine about a year ago.

Yours faithfully,
THOS. ORCHARD LISLE.

Crude Oil Engines



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(Continued From Page 11)

ering—54 days in load and 12 in ballast. Her fuel-consumption is only seven (7) tons per 24 hours when loaded, or 6¼ tons light. Trial speed 11.3 knots.

It is, of course, most difficult to get information of this nature out of shipowners, who naturally are reluctant to give information of competitive value to other shipowners, and where such data is given it is accounted for by their unbounded enthusiasm for the marine oil-engine. Lastly we will refer to two motorships of the Royal Packet Company's fleet, namely the "Sembilan" and the "Loudon." In both cases very little time was lost for repairs. In the first three years the "Sembilan" made 90 voyages, and a total of about $2,400.00 was spent in repairs, while the "Loudon" made six voyages in the first twenty months of her operation and about $1,600.00 was spent on her for repairs during that period. Their steamer, the S. S. "Van Lansberge," made 90 voyages in 22 months, and her total cost of repairs was $1,000.00, so that there is very little difference in that respect.

"ERIS" AND "ESPERANCA" FITTED WITH WINTON DIESEL ENGINES.

The first set of Winton oil engines, contracted for by the Peninsula Shipbuilding company of Portland, Ore., have been installed in the "Eris" and the "Esperanca," originally the "Alpha" and the "Beta." These engines are of the full-Diesel type and are of 300 b. h. p. each, two being installed in each vessel. These engines have had a very successful tryout in the factory, the manufacturers state, and have proven very satisfactory. On their trials installed in the new western type of wooden schooners, they will be closely watched by all shipowners and mariners.

OIL TOWBOAT "ALPHA."

The gasoline sloop "Alpha," for many years used as a supply boat for the Southern California Fish company, at that time packing sardines at East San Pedro, has been converted into a cannery tender and is now owned by the Curtis Corporation, operating at Long Beach. The tender is equipped with a Fairbanks Morse surface-ignition engine and is giving excellent satisfaction, particularly from the standpoint of economy. The engines are rated at 60 h. p. and in a test tow made last winter from Point Dume to Long Beach, with a kelp barge, the trip was made at a cost of $3.60 for fuel, as against $23 on a boat of similar size, burning gasoline.

DIESEL-ENGINED YACHT IN PORT.

One of the handsomest yachts to visit Baltimore, even considering the "Corsair," is the twin-screw "Aramis," named after the third of Alexander Dumas' Three Musketeers. She belongs to Lieut.-Com. A. X. Marks, of Akron, Ohio, a member of the United States Naval Reserves and now in active service. He ordered the "Aramis" there from New York, and she has taken anchorage off the Baltimore Yacht Club, awaiting his orders. Capt. Gus Anderson, her sailing master, and a crew of 12 men constitute the working force on board. It was reported that the "Aramis" was brought there to be turned over to the government as a voluntary gift from her owner to be used in patrol duty for which she can be used.

The "Aramis" is a new craft, built at City Island, N. Y. She is 157 feet long, 23 feet beam and is palatial in her outfit. She is driven by Diesel oil engines, which are said to have been imported at a cost of $40,000.

PROPOSED SUBMERSIBLE FREIGHTERS.

It is reported from Philadelphia that the Merchants Submarine Co., a $10,000,000 corporation, has been incorporated with Simon Lake (the famous submarine inventor) mentioned as one of the organizers.

It is further reported that the Merchants Submarine company will build and operate submarine freighters of about 7,000 tons.

P. A. F. EXTENDS SHIP YARD.

The Pacific American Fisheries company is extending its shipyard at Bellingham, Wash., in anticipation of Government orders for wooden vessels. Hitherto their yard has been used to build vessels for the company's own use only.

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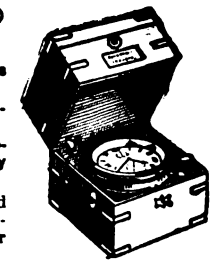

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SHIPPING POLICIES FOR WAR AND AFTER.

A timely word of warning was uttered by Dr. Edward A. Rumely, publisher of the Evening Mail of New York, in the issue of that newspaper of July 17th last, under the above heading. The following are a few of his remarks:

"America possesses two-thirds of the oil output of the world. We must not only retain and develop our oil holdings, but increase them, particularly in the nearby Mexican republic. We must establish oil fuel stations over the seas, as Great Britain has established coaling stations, the basis of her maritime and naval power. The oil age at sea should be America's age.

And yet the great American corporation, the Standard Oil Company, which should be engaged in laying the basis for an American oil age at sea, has been so hampered by our government that it is unable and unwilling to perform the task. A new great oil combination, the Royal Dutch Shell Company, supported by Dutch and British capital, is, instead of Standard Oil, doing the work of controlling production and supply of oil in the world."

Connected with the Royal Dutch Shell are some of the cleverest and smartest brains in the world and the recent disposal to general American interests of $60,000,000.00 of stock is one example of the astute methods by which this great company establishes a sound footing in the United States. Their enterprises will be assisted by the large fleet of Diesel-driven motorships which they possess and which will be increased after the war. As we previously have indicated, it is madness of American oil interests not to meet this competition on level grounds by means of motorship transportation of oil. We presume that they know their business best; but we are the onlookers, and onlookers see most.

HUGE PROFIT FROM ONE MOTORSHIP.

The Hamlet Steamship Co., of Denmark, owners of the new Diesel-driven motorship "Hamlet," already have paid a dividend of 15 per cent in addition to writing off 303,000 Kroners ($90,900) for depreciation, yet the company was only started in April, 1916. This motorship is of 7,000 tons net, and is the only vessel of any kind owned by them, but they were enabled to show a surplus of 746,596 Kroners ($226,375). Yet there are people who still doubt that Diesel motorships are reliable. Here are the results of one year's operation of such a ship, which speaks for itself. Are we blind, stupid, or merely obstinate?

NEWFOUNDLAND MOTORSHIP LINE.

A company has been formed to establish a motorship fleet to export fish from Newfoundland, says the British Motorship and Motorboat. The capital is $630,000.00, and the first ship will be of 700 b. h. p., and will have a speed of 13 knots.

POSITION WANTED

Mechanical engineer with eight years experience with marine oil engines of the double-acting two-cycle, single-acting two-cycle and four-cycle Diesel type, for many years connected with one of the leading concerns in Europe, wants leading position in a shipyard building oil engines. Address X 37, care of Motorship.

CAPITAL WANTED
Two mechanical engineers want to get in touch with manufacturer or party willing to support manufacturing of oil engines for government service. A-1 experience and references. No experiments.
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